Gas Journal

VOL. 300 111th YEAR LONDON, OCTOBER 14, 1959 No 5015 PRICE 1/6

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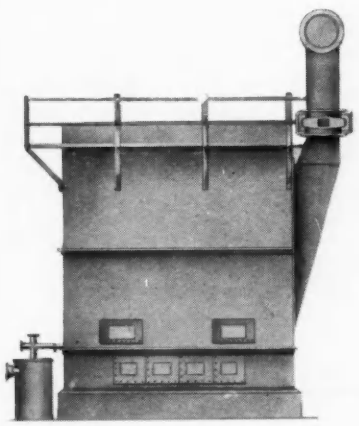
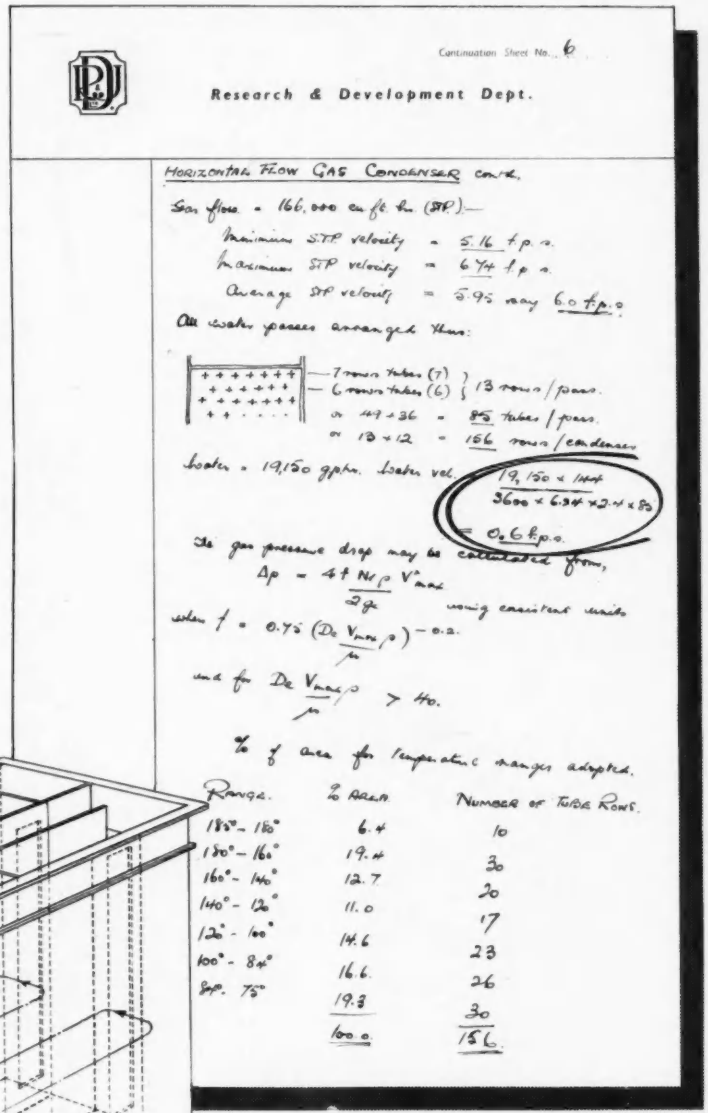
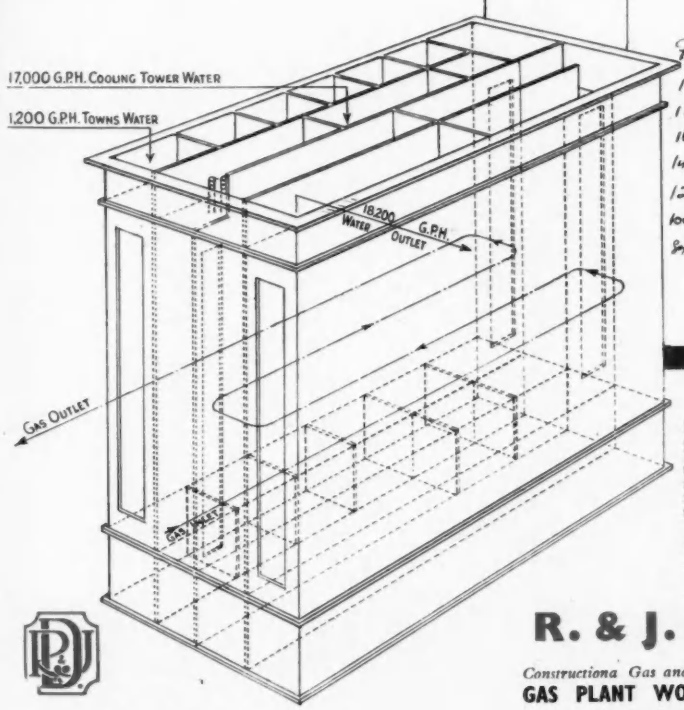
CROSS TUBE FLOW CONDENSER

for

GAS COOLING




Continuation Sheet No. 6
Research & Development Dept.
HORIZONTAL FLOW GAS CONDENSER cont'd.
Gas flow = 166,000 cu ft hr (STP)—
Maximum STP velocity = 5.16 f.p.s.
Maximum STP velocity = 6.74 f.p.s.
Average STP velocity = 5.95 say 6.0 f.p.s
All water passes arranged thus:
7 rows tubes (7)
6 rows tubes (6)
13 rows/pass.
or 14 + 36 = 85 tubes/pass.
or 13 × 12 = 156 rows/condenser
Water = 19,150 gpm. Water vel.
19,150 × 1.44 / 3600 × 6.34 × 2.4 × 85
= 0.6 f.p.s.
The gas pressure drop may be calculated from,
Δp = 4f Nr ρ V²max / 2g
using consistent units
when f = 0.75 (De Vmax ρ / μ)^-0.2.
and for De Vmax ρ / μ > 40.
% of area for temperature ranges adopted.
Range. % Area Number of Tube Rows.
180°- 160° 6.4 10
160°- 140° 19.4 30
140°- 120° 12.7 20
120°- 100° 11.0 17
100°- 84° 14.6 23
84°- 75° 16.6 26
19.3 30
100.0 156



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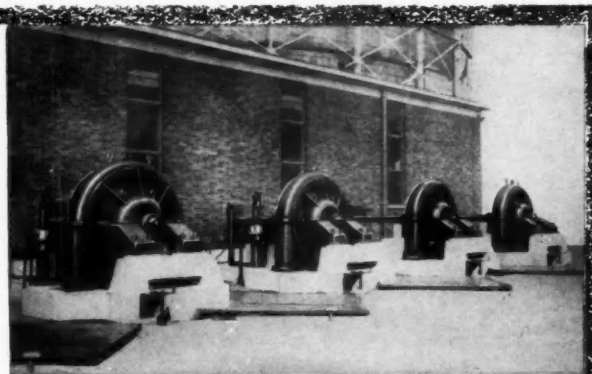

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Gas Journal

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IIITH YEAR

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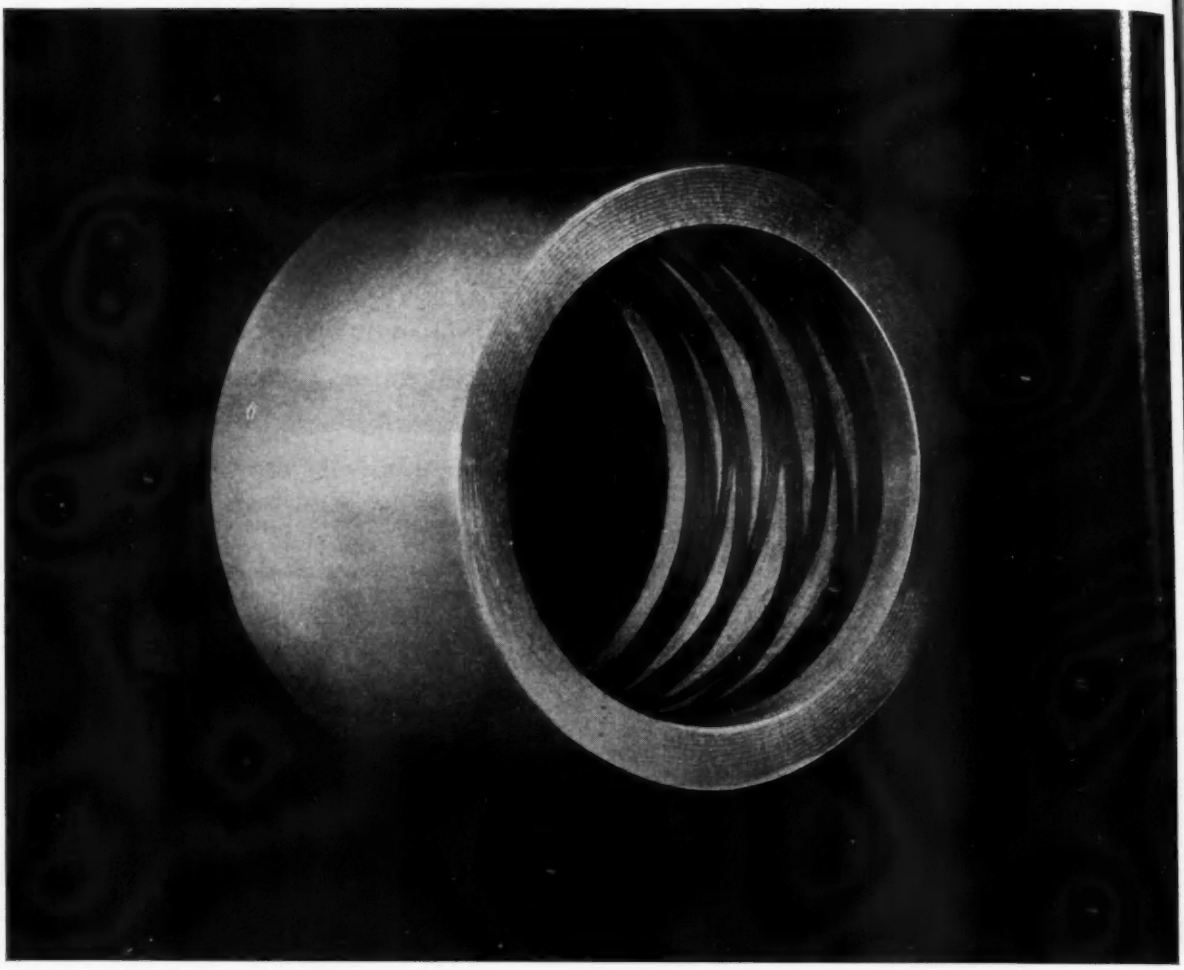

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Gas Journal

VOLUME 300 No. 5015 OCTOBER 14, 1959 111th YEAR

A Year of Difficulty

THE tenth Annual Report of the Gas Council for the year ending March 31, 1959, published yesterday, shows an overall deficit for the industry of £1,466,882 compared to a corresponding surplus of almost double that amount—£2,820,610—for the previous year. Of the 12 area boards, only five made a surplus, which varied from £451 by the Eastern Gas Board to £563,008 by the Northern Board; the deficits ranged from over £1.3 mill. for the Scottish Board to £53,000 for the North Eastern Board. The total income from all sources over the year was actually about £1 mill. greater than the previous year, the decrease in income from coke and other products of £9.6 mill. being more than wiped out by increased revenue from gas sales—£2.8 mill.—and from sales of appliances—£7.8 mill.

The cause of the overall deficit was undoubtedly the increased costs which have been rising steadily over the last few years. Although there was no increase in the price of gas during the period under review, three of the seven boards which incurred the deficits have announced price revisions since. Though clearly necessary to cover these increased costs—the largest being £3.4 mill. in a complete year—any increase in gas prices must be deplored at a time when such a vital development in the domestic gas load as space heating is being launched by so many boards. The success of this operation depends so much on stable gas prices every bit as much as on favourable tariff terms.

The report points out that the area boards' policies of greater integration of gas manufacture and the centralisation of administration are being continued and both of these aspects of area board development are reflected in the total numbers employed in the industry. At the end of March, 1959, there was a total of 132,576 employees compared with 136,379 a year before, a drop of some 3%.

The clue to lower gas prices must be sought in lower manufacturing costs brought about by new gas-making processes. It is clear that many such processes are being investigated and two commercial-scale plants are being built, the one a hydrogenation plant at Partington, near Manchester, and the other the Lurgi complete gasification plant at Westfield in Fife. Although a section of the latter will be gasmaking next year, it does not seem that the Partington plant will be in operation for several years. This is most disappointing and we feel that a very greatly increased impetus should be given to all such developments to reduce the need for high-grade gasmaking coal in gas manufacture. Both these types of plant can be built with potentially high outputs and if the full impact of cheap gas on sales by the industry is to be felt before town gas prices itself out of the market, these developments must come quickly.

Even the overall increased efficiency of carbonisation which is continually being made by the scrapping of inefficient plant cannot counteract this tendency for costs to increase. During the year new gas-making plant, equal to 107 mill. cu.ft. per day, replaced old plant with a capacity of 130 mill. cu.ft. per day, giving those plants in commission a total capacity of 12,532 mill. cu.ft., or 12 mill. therms per day in 463 gasworks, a fall of 73 since the year before.

Although the increased efficiency of carbonisation did in fact reduce the coal carbonised by 2.5 mill. tons, with an annual saving of £15 mill., it is interesting to note that other forms of gasmaking are slowly increasing. Carbonisation accounted for 65%, c.w.g. for 14%, oil and other gases for 2.3%, coke oven gas for 16%, and oil refineries and other sources for 2.2%. The use of oil and refinery gas seems to be increasing, and with the successful importation of several cargoes of liquid methane the way seems open for this particular source of gas to be developed on a large scale. A source of rich, clean, non-toxic gas such as this will do much to further the Gas Council's plans for safety in the kitchen, especially for those, elderly and otherwise, living alone.

Altogether we feel that in spite of a year of difficulty caused by a slight trade recession, the industry has done well to limit its deficit in the face of increasing costs, but we think that greater efforts should be forthcoming in speeding up developments; this may be all the easier in view of the continuance of the present Government for a further period.

Well, Where Do We Go From Here?

THE pattern of the Gas Sales and Service Conference at Harrogate last week, as Sir Harold Smith explained in his opening address, was designed to make us ask ourselves, in the face of increasing competition, 'Where do we go from here?' The implication that that the conference was expected to supply the answer. That it did little more than drop a few hints was not the fault of the organisers, who provided a 'bill' which promised a good deal more than it delivered. Basically the blame—if that is not too strong a word—must be laid at the door of the delegates, and we were forced to the conclusion that in general sales and service personnel are sadly lacking in ideas and eagerness to express them. Perhaps that is not surprising when one considers how little rein they have been given in the past. But it is disappointing to have to record that the conference, which had been given a provocative sounding programme, and had been designed to permit the maximum amount of discussion—a thing we have always advocated—failed to generate the power expected of it.

However, like the curate's egg, the meeting was good in parts, and in the course of the following review we shall attempt to direct readers' attention to some of the highlights, dwelling only lightly on the less exciting portions.

The conference, having been welcomed on this, its second visit to Harrogate, by the Mayor, first received an address by Sir Peter Roberts, now as then M.P. for the Heeley Division of Sheffield, and read in his absence by Mr. R. J. Gregg at, to quote Mr. Sydney Smith, 'a cracking pace.' His address took the form of an erudite and admirably crisp survey of the present state of the industry in relation to competition and, in particular, a review of present and future methods of production. He concluded with the words: 'There are no guaranteed customers. They are not nationalised; they are free to choose their resources of fuel and power. And so your aim must be unchanged—to give the best and fullest service possible at the lowest economic price.'

Re-birth of the Industry

This, of course, tied up with the remarks made by Sir Harold Smith (see last week's 'JOURNAL') concerning the gas industry's responsibility to its consumers, and Sir Harold was quick to point out the connection when he made his opening address to the first business session. He added a postscript to the much publicised comments he is supposed to have made on the Coal Board, claiming that the reports by general and highly responsible newspapers were 'distorted . . . beyond anything I have ever seen.' (This matter is reported elsewhere in this issue.) He also suggested four things the industry must do: '(1) We must get over to the public the fact that the gas industry is very much alive and kicking, that it has been re-born and that it exists to afford the best service at the lowest cost; (2) we must develop as quickly as we can new processes for making gas and new methods for its distribution with the object of supplying better gas at a lower cost when compared with other fuels; (3) we must make readily available to our customers the most efficient and attractive appliances; (4) we must overhaul our selling methods and by putting more power behind these and by introducing tariffs designed to encourage consumers to increase their consumption, increase the sales of gas and appliances with consequent lowering of costs.'

The last point served as an introduction to Mr. V. W. Stanton, Commercial Manager and Member of the South Eastern Gas Board who described some 'Problems of Progress', placing particular emphasis on the fact that as the cooker load will not give the industry the expansion of sales it needs, it is to water heating and perhaps more particularly to space heating, that we must look for future opportunities.

'Brand Image' of Gas

He was followed by Mr. H. R. Hart, Member of the Scottish Gas Board and Manager of its Glasgow and Western Division, who scored a major hit with his address on 'A Policy for Marketing Domestic Gas,' He called for the creation of a new 'brand image' for gas by means of mass media advertising, the pursuance of an aggressive sales policy towards ensuring that all new buildings have a gas supply available, the marketing of most gas appliances through a separate sales organisation partly or wholly owned by the gas boards and enlisting leading retailers as agents while maintaining the industry's direct sales force in a liason and sales development role, and the establishment of dynamic adventurous leadership to match the inspired, imaginative efforts of our engineers'. None of these ideas were exactly new but at least they were timely and Mr. Hart sold them with admirable conviction and a fine exhibition of rhetoric.

In the discussion which followed delegates ranged over such matters as the need to sell (more uniform) tariffs, the importance of enlisting the aid of heating engineers, the value of a new housing development committee, the possible advantage to be gained by abandoning the 'therm', and the need for easier h.p. terms, for helping the drying cabinet load, and for cutting down the paper work for dealers. It was all quite stimulating and we felt the conference had got off to a good start.

This encouraging impression was furthered during the first part of the home service session (very properly brought forward into the main body of the conference) under the chairmanship of Sir Henry Jones, with Mrs. Joan Robins, the Gas Council's Home Service Adviser, acting as his Woman Friday. First item on the programme was an address by Miss Hilda Swindells, Chief Home Service Adviser of the North Western Gas Board. It was unfortunate that in order to show the many ways in which home service advisers can help in selling campaigns, it was necessary first to sell home service to the gas industry. However, until such time as area boards wake up to the realisation that they have such a first-class sales weapon already in their armoury,

every home service paper must be angled in this way. Miss Swindells made it clear that she was presenting the combined views of the Area Home Service Advisers' Committee and it is to be hoped that the ideas submitted appealed to her unusually large and influential audience.

There followed a remarkable demonstration on 'Teaching the Teenager' for which the audience was swelled by 40 girls from St. Peter's School, Harrogate. For this Chris and Carol, two characters in the Gas Council-sponsored strip cartoon in *Girl* were brought to life by a pair of extremely talented North Thames girls. The uninhibited cookery demonstration which followed had a lot of unusual features (including a rock 'n roll accompaniment) but it scored a tremendous success with all age groups in the audience. The importance of interesting teenagers in gas can hardly be exaggerated and it became clear from Mrs. Robins' extremely interesting talk that this knotty problem is being tackled in several imaginative ways.

The session concluded with an address by Mr. Peter Parker, M.V.O., Director of Bookers Engineering Holdings Ltd., whose brilliant career includes the organisation of the Duke of Edinburgh's Study Conference at Oxford. As an orator Mr. Parker has great gifts and his scintillating performance was a pleasure to hear; just what he was talking about completely escapes us.

On paper the next morning's session by the S.B.G.I. looked highly promising. One felt that if the eminent representatives of the appliance manufacturers on the platform failed to give the industry a lead, then at least delegates would have a chance to give a lead to the makers. Alas, nobody gave anything approaching a lead, and the audience was left to wallow in a welter of platitudes and trivia. However, a few important matters were discussed—why the gas industry has failed to make the grade in the home laundry market, whether the makers should individually or collectively extend their advertising to T.V., how appliance testing could be speeded up, and the relationship between competition and price. But it all rather lacked grip and one wondered why both the platform and the audience passed up such a unique opportunity to make public some of the grouses which they are so ready to air in private.

Skilful Organisation

The final session, 'The Voice of Mr. Therm,' brought us to Mr. Gregg, whose organisation of the conference was so skilful that most sessions actually ran ahead of schedule. What is the good of organising a conference if you cannot organise yourself into a star part? As Publicity Manager of the Gas Council, Mr. Gregg is concerned with making the industry more publicity-minded, and to this end he assembled four gentlemen from the publicity world who answered questions, the nature of which prompted Sir Harold Smith to remark that it seemed everything an area board did was marvellous and everything the Gas Council did was lousy! But, he pointed out, it was wrong to talk of the Gas Council as 'they'—after all, 'they' were the area board chairmen.

In addition to Mr. Gregg's opening address, the session included a talk by Dr. Mark Abrams, Director of Research to the London Press Exchange Ltd., whose contribution to the last conference was thought by many to be its highspot. On this occasion he spoke on 'Market Research and the Gas Industry.'

Incidentally, the session was considerably enlivened by the inclusion of a talkie strip called 'The Voice of Mr. Therm' (with Greggorian sound track) and a first-rate new cartoon called 'Piping Hot.' Both strongly recommended.

Credit for Humour

So far we have refrained from mentioning the industrial and commercial sessions, of which there were two, both excellent and both operating under the chairmanship of Mr. R. F. Hayman, the Gas Council's Industrial Gas Officer. During the first, Mr. W. F. Howell, Industrial Engineer, Manchester Group, N.W.G.B., performed a timely service for the industry by showing what opportunities were created by current legislation, while Mr. R. Davis, the Gas Council's Chief Accountant, made history by presenting a *humorous* paper on the financial implications of industrial gas sales. We hope to devote space to both of these in the 'JOURNAL.' The second session was unusual in that it dealt with improved standards of heating and eating, the respective authors being Mr. W. F. Moore, Heating Engineer to the S.E.G.B., and Mr. W. T. Lane, Education and Training Assistant to the S.W.G.B.; to the latter fell the distinction of presenting the only paper to be presented at any of these conferences on the valuable but too frequently overlooked catering load. Not surprisingly Mr. Lane is education minded, and in advocating the more intensive training of salesmen in the real mechanics of catering (as opposed to catering appliances) he echoed sentiments which we have often expressed in these columns. No longer are we a voice in the wildnerness!

So much for the business sessions. There was also the usual accompanying exhibition and it is only fair to report that this was an unqualified success. All exhibitors to whom we spoke were delighted with the opportunity afforded them of showing their latest products to the men and women who would sell them.

We said at the outset that the conference did not entirely live up to its promise. But to be fair, do conferences of this type often come right up to expectations? They do not, but that does not mean that they cannot achieve a great deal of good, both in the interchange of speakers' ideas and in the bringing together of hundreds of people whose business interests are bound up with the future of gas. If the meeting at Harrogate did nothing else it at least served to remind us that we can only beat our competitors by casting off many of our existing out-dated conventions and utilising modern techniques in market research, publicity, training and marketing. We must be prepared to think of the sales side of the industry not as a mere distribution outlet for the production engineers, but as a highly-geared retail business which makes full use of every sales aid available to modern business.

Restrictions on space have forced us to deal somewhat sketchily with events at Harrogate. The conference will be fully reported—and lavishly illustrated—in the October issue of *Gas Service*.

Personal notes

MR. J. IVAN YATES, son of Mr. H. James Yates, founder of Radiation Ltd., has left Radiation Ltd. Educated at Cheltenham College, and St. John's College, Oxford, he entered Peat, Marwick, Mitchell & Co. in 1925, and joined John Wright & Co. Ltd., in 1926. He became a director of Radiation Ltd. in 1935. In addition he was chief executive and later managing director in charge of the Midland group of companies, extending over a period of 15 years, during which time he was responsible for introducing planned methods of production, time and motion study, and various training schemes for employees, including foremen discussion groups, for which work he was recognised by the Institution of Production Engineers by being made a full member. He is an Associate of the Institution of Gas Engineers, chairman of the Australian Association of British Manufacturers 1956-1959, member of the Grand Council of the Federation of British Industries, and a governor of the University of Birmingham. He was president of the Birmingham Chamber of Commerce from 1954 to 1955, member of the Board of the Engineering and Allied Employers' Association (Birmingham and district) 1949, and vice-president 1956, also member of the General Council of Engineering and Allied Employers National Federation 1956. For the last 18 months he had been managing director of Radiation Group Export Sales Ltd., travelling widely in the interests of the company.

MR. W. COMPTON CARR, Managing Director of Radiant Heating Ltd., and a Director of George Wilson Gas Meters Ltd., the parent company, became Conservative M.P. for Baron's Court last week with a majority of 913, ousting his Labour opponent, Mr. Tom Williams, whose majority at the last election was 125.

MR. G. A. SMALL, superintendent at Selby gasworks, North Eastern Gas Board, for the last 17 years, has retired and has been succeeded by his son, MR. FRED SMALL. At a recent ceremony Mr. J. T. Mulholland, Manager, presented Mr. Small with an inscribed watch to mark the occasion, from members of the staff.

MAJOR W. R. BROWN has now relinquished the post of joint managing director of the Power-Gas Corporation Ltd., but continues as Chairman of the Board. MR. C. E. WRANGHAM is now sole Managing Director of the company and continues as vice-Chairman of the Board.

MR. THOMAS TWOMEY, General Manager, Eagre Construction Co. Ltd., railway and civil engineers, Scunthorpe, has been made a Director of that company, together with MR. JOHN P. P. SPAFFORD and MR. DAVID M. H. SPAFFORD.

MR. R. J. BAINES, Sales Manager of Henry Balfour & Co. Ltd., has just left England for a short visit to Nigeria. He hopes to meet ministers of the three Nigerian governments and discuss the wide range of development in that country's industrial expansion.

MR. PETER BOYD-COX has been appointed Public Relations Officer of Electrolux Ltd. The appointment is a new one and Mr. Boyd-Cox will work in close co-operation with the company's Publicity Manager, MR. L. J. DONALD, at 419, Oxford Street, London, W.1. Mr. Boyd-Cox was formerly with the General Electric Co. Ltd., as press officer of the G.E.C. Lighting Division and the Osram Lamps Division and was editor of the *Osram Bulletin*. He joined the electrical industry as an engineering apprentice with A. E. Dean & Co. Ltd., of Croydon, Surrey. On completing his apprenticeship he took up publicity work and for a time was in the publicity department of Cable & Wireless Ltd., and he joined the G.E.C. in 1955.

MR. W. M. JOHNSTON has been appointed Press Assistant in the Press and Public Relations office at the headquarters of the Scottish Gas Board in Edinburgh. He took up his duties last week. Mr. Johnston has for nine years been deputy chief reporter on the *Glasgow Herald*, the *Bulletin* and the *Evening Times*. Mr. Johnston's name is associated with many authoritative articles written on motoring, motor cycling and railway topics. An enthusiastic piper, he is a member of the Highland Pipers' Society.

REQUIEM MASS FOR DAME VERA

Solemn requiem mass was celebrated in Westminster Cathedral, London, on October 2, for Dame Vera Laughton Mathews. Queen Elizabeth the Queen Mother and the Duchess of Kent were represented with leaders of the armed forces and industry. Among those from the gas industry were Sir Harold Smith and Sir Henry Jones, Chairman and Deputy Chairman respectively, the Gas Council; Chairmen and representatives of the Boards; Mrs. G. E. Evershed, Chairman, Women's Gas Federation; Miss W. O. F. Lloyd and Miss J. Frith, Secretary, representing the British Federation of Business and Professional Women; Mrs. Joan Robins, representing the National Council of Women of Great Britain; Mr. L. W. Andrew, Director, Watson House, representing the Institution of Gas Engineers; Mr. R. W. Reynolds Davies, Secretary, Institute of Fuel; Mr. M. W. Burt, Society of British Gas Industries; Mr. A. Marsh, National Society of Clean Air, with Dr. A. Lessing, and Mr. David Woodall.

Diary

October 17.—WESTERN JUNIORS: Bristol. Inaugural Meeting including Paper on 'Ducted Warm Air,' by J. Long. 2 p.m.

October 17. — MANCHESTER JUNIORS: Southport. 61st Annual General Meeting and Presidential Address.

October 17.—YORKSHIRE JUNIORS: Doncaster Showrooms. Annual General Meeting.

October 19. — EASTERN G.C.C.: Connaught Rooms, Great Queen Street, Kingsway, W.C.2. Council Meeting at 11 a.m.

October 20. — NATIONAL SOCIETY FOR CLEAN AIR: Seymour Hall, London, W.1. The Diamond Jubilee Conference, and Exhibition.

October 20.—MIDLAND JUNIORS: Film Evening: (1) Oil Harbour—Aden (G. Wimpey & Co. Ltd.). (2) 'The Rival World' (Shell Mex & B.P.).

October 21. — SCOTTISH WESTERN JUNIORS: Visit to Caterpillar Tractor Co. Ltd., Tannochside, Uddingston. 7 p.m.

October 21. — EASTERN JUNIORS: Ipswich. Visit to Cranes Works.

October 21.—INSTITUTE OF FUEL: Great George Street, London, S.W.1. 'The Use of Oxygen in Combustion Processes with Particular Reference to the Steel Industry,' by T. C. Churcher. 5.30 p.m.

October 21.—I.G.E. SOUTH WESTERN SECTION: Bristol. Annual General Meeting and Address by Chairman, 2.30 p.m., preceded by luncheon at the Grand Hotel, Bristol, at 1 p.m.

October 21.—INSTITUTION OF CHEMICAL ENGINEERS: Burlington House, Piccadilly, W.1. 'Gas-Solids Contacting in Fluidised Beds,' by K. P. Lanneau. 5.30 p.m.

October 22.—MIDLAND JUNIORS: Visit to Messrs. W. J. Jenkins & Co., Retford.

October 22.—NORTHERN JUNIORS: Visit to Messrs. Reddaways—St. Anthony's Newcastle-upon-Tyne.

October 23.—LONDON AND SOUTHERN JUNIORS: Westminster Technical College, Vincent Square, S.W.1. General Meeting and Paper on 'New Water Gas Plant at East Greenwich,' by A. G. Gaston. 6.30 p.m.

October 24.—LONDON AND SOUTHERN JUNIORS: Visit to the Isle of Grain Works of the South Eastern Gas Board.

October 27.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster, S.W.1. Meeting at 11 a.m.

October 27.—JUNIOR INSTITUTION OF ENGINEERS: Pepys House, Rochester Row, Westminster, S.W.1. 9th Annual General Meeting, followed by paper on 'Selling Domestic Gas Appliances,' by S. A. King, of Messrs. R. & A Main Ltd. 2.40 p.m.

Bio-gas plants recommendation to Indian Govt.

A BIO-GAS delegation from Hungary, led by Mr. Sandor Ronai, Director, Ministry of Constructions, has recommended that the Indian Government should establish a permanent committee to tackle the question of production of organic fertilisers and bio-gas. The delegation arrived in New Delhi in mid-August at the Indian Government's invitation.

The committee would, on the basis of data of agricultural wastes, determine the fermentation technology to be used and also determine the regions which would be supplied with energy from bio-gas plants. The delegation has recommended the establishment of a bio-gas plant at the National Sugar Institute, Kanpur, to study the problem of bagasse fermentation, and has also recommended the setting up of farm bio-gas equipment as well as village bio-gas plants.

Hungarian design

Detailed data regarding these has been worked out by the delegation, which has also recommended that on the basis of working of these experimental plants, the Indian Government might establish bio-gas and bio-fertiliser plants of medium and big sizes for the manufacture of organic fertilisers and bio-gas. Design institutes in Hungary would carry out the design work.

Vauxhall site sold to A.T.V.

THE old Vauxhall gasworks site, which was placed on the market early last year by the South Eastern Gas Board, has been bought by Associated Television, Ltd., for future development in connection with their organisation.

The site, on the south side of the River Thames by Vauxhall Bridge, is free-hold and extends for about seven acres with frontages to Wandsworth Road, Bridge Approach, and the river. The purchase price is understood to have been in excess of £500,000. In a statement last night confirming the purchase Associated Television Ltd. stated that plans were being prepared for submission to the London County Council.

AIR POLLUTION CONFERENCE

MORE than 170 representatives from 29 countries will join 1,000 U.K. members and delegates at Seymour Hall, London, from October 20 to 23 at the biggest world conference yet on air pollution. It is being organised by the National Society for Clean Air to celebrate its diamond jubilee.

No quarrel between us and the N.C.B. says Sir Harold

'CO-OPERATION WAS NEVER BETTER'

SIR HAROLD SMITH, Chairman of the Gas Council, said at Harrogate last week that there was no quarrel between the Gas Council and the National Coal Board. 'There have been indications during the past few months of someone, or somebody, trying to foster antagonism between the gas industry and the coal industry,' he told delegates to the recent Sales and Service Conference.

'Distorted reports'

'But the distorted reports on the relationship between the two industries which appeared last week—largely by inference—were beyond anything I have ever seen. I can only imagine that the proximity of the general election was too much for some people. I want to say most emphatically that there is no battle on between the gas industry and the coal industry; there is no quarrel. The fact is that co-operation between the industries at top level is closer now than it has ever been.'

Sir Harold said the industry must quickly develop new processes for making gas and supply it at a lower cost. They must have available the most efficient and attractive appliances and must overhaul selling methods to increase consumption. 'We have quite a few lean years in front of us—there is no doubt about that,' he said. 'But then I think we shall find we can produce gas cheaper than comparable forms of fuel.'

Sir Harold reiterated the Gas Council's intention to seek new ways of producing gas at the lowest price, and emphasised that the industry now had available a variety of raw materials. Nor did he disguise his enthusiasm for importing liquid methane gas from South America. The 'Methane Pioneer' had been running on a regular schedule since February, and the experiment reflected the greatest credit on all who participated in it, he said.

We never stopped

To enable production to be maintained at Electrolux Ltd.'s refrigerator factory at Luton during the unofficial strike of oxygen transport men, the company arranged a special daily airlift of oxygen to be flown from the continent to Luton Airport.

'Coal price will not increase'

AN undertaking not to increase the price of coal 'unless circumstances arise completely beyond its control,' was given recently by the National Coal Board. The last time the board increased prices was in July, 1957.

This qualified undertaking on prices was given by Mr. R. H. E. Thomas, the Board Member responsible for marketing. He was introducing a new campaign to 'put coal back on the map.' Asked what inducements the board was prepared to offer potential customers, Mr. Thomas said: 'We would not sell any more coal in this country by reducing our prices.'

D.S.I.R. grant to psychology institute

THE Department of Scientific and Industrial Research is to continue its annual grant to the National Institute of Industrial Psychology for a further five years. The amount is to be raised from £4,000 to £6,000 a year, on the understanding that the Institute will increase to £9,000 a year its own income from membership subscriptions and special contributions for long-term research.

Up to now, the D.S.I.R. has provided £4,000 if the Institute raised a like sum from these sources. The D.S.I.R. is also to add another £100 a year for every £100 of grant-earning income which the Institute can obtain, in excess of the qualifying £9,000, up to a maximum of another £6,000 a year. Previously, the maximum was £4,000 for income in excess of £4,000. This means that if the Institute can raise £15,000 a year from industry, the Government will give it £12,000. The grant and the grant-earning income have to be put in a special fund and used only for long-term research. The D.S.I.R. grants began for a three-year trial period in October, 1956. Last year, the Institute received the maximum, under the old arrangements, of £8,000. Most of the grant-earning income comes from industrial firms who contribute as corporate members of the Institute.

Among research projects now in train are an inquiry into workers' attitudes to the opportunities and rewards offered by their jobs, which may have a bearing on personnel policies; an investigation into the relation between satisfaction and efficiency on the job; a study of industrial management structure and efficiency and experiments on tests for manual skills.

Tenth Year's Results

FIRST LOSS SINCE NATIONALISATION

FOR the first time since nationalisation the gas industry made a loss for the year 1958-59. The aggregate result of the boards' operations for the year was a deficit of £1,466,882. Seven boards incurred losses totalling £2,796,570 and five boards achieved surpluses totalling £1,329,688. After taking into account the balance on revenue account at March 31, 1958 (£5,321,592), transfer from reserve fund (£30,000), transfers from reserve for future taxation (£560,000), and adjustments relating to prior years (£273,651), the total disposable surplus was £4,718,361.

Five boards made transfers to reserve funds amounting to £675,000; five boards made transfers to replacement and obsolescence reserves totalling £825,000; the West Midlands Board transferred £15,109 to an investment reserve; and the balance carried forward on revenue account for the boards as a whole was £3,203,252.

The deficit has arisen in part as a result of the decline in gas sales which were 1.7% below those in the previous year, the main causes being the industrial recession and the relatively mild weather. On the expenditure side there have been wages and salary awards costing £1.9 mill. during the year.

The total income of all boards from sales of gas was £225.6 mill. The quantity of gas sold was 2,605 mill. therms compared with 2,651 mill. therms in 1957-58, a decrease of 1.7% compared with an increase of 1.7% in the previous year.

The approved investment for the gas industry for 1958-59 was £53.5 mill. The actual expenditure by the industry on fixed assets during 1958-59 was £46.1 mill., the underspending being due mainly to the delay, or revision, of a number of projects for gas-making plant, and the slowing-up or deferment of a number of main-laying projects. Capital expenditure during the year on manufacturing plant was £16.7 mill. and £11.7 mill. was spent on mains. The total capacity of gasmaking plant brought into use was 107 mill. cu.ft. a day; the capacity of plant scrapped and abandoned was 130 mill. cu.ft. a day. Oil gasification units account for 71 mill. cu.ft. of the new capacity, and coal-using plant 31 mill. cu.ft. a day. The total capacity of manufacturing plant at March 31, 1959, was 2,532 mill. cu.ft., or 12 mill. therms a day. There was a net increase of 1,718 miles of mains in use during the year, bringing the total length of mains in use to 93,777 miles.

There are now 463 manufacturing stations compared with 536 at the end of the previous year.

The average income per therm of gas sold was 20.8d. compared with 20.2d. in 1957-58. Unread gas at March 31, 1959, was valued at £27.6 mill. compared with £27.9m. mill. at the close of the previous year.

The gross cost of gas and products manufactured and purchased was £216.3 mill. Deducting the net income from products other than gas (£90.6 mill.) the net cost of gas manufactured and purchased becomes £125.7 mill. Expressed as an average cost per therm of gas sold this is 11.58d. compared with 11.21d. in 1957-58.

At the end of the year domestic consumers numbered 12,177,593 compared with 12,173,735 at the end of the previous year. Average consumption per domestic consumer fell from 109.0 to 107.4 therms, domestic gas sales totalled 1,308.3 mill. therms (1,326.3 in the previous year), industrial 769.6 mill. therms (788.7), commercial 400.1 mill. therms (398.6).

Appliance sales were up. The number of cookers sold, for example, increased from 540,000 in 1957-58 to 667,000 in 1958-59, an increase of 23.5%. Cash and credit sales of all appliances were £ 2.0 mill. (£11.5 mill. in 1957-58) and sales on hire purchase were £25.0 mill. (£ 7.7 mill.).

Coke produced totalled 10.9 mill. tons, against 11.8 mill. tons in the previous year; coke sales were 9.2 mill. tons (9.6). Breeze production was 2.6 mill. tons (2.7) and breeze sales 1.7 mill. tons (1.7).

FINANCIAL RESULTS AT A GLANCE

SURPLUS		
	Eastern	**451**
	East Midlands	**153,014**
	Northern	**563,008**
	West Midlands	**582,368**
	Wales	**30,847**
DEFICIT		
	North Eastern	**52,966**
	North Thames	**202,169**
	North Western	**589,780**
	Scottish	**1,328,398**
	South Eastern	**414,995**
	Southern	**83,892**
	South Western	**124,370**
	Total	**1,466,882**

BOARDS'

West Midlands

THE West Midlands Gas Board had a surplus of £582,368. Gas sales, however, at 320 mill. therms were 1.2% lower than in 1957-58. The decrease, say the Board, would have been greater but for a revival in the motor car trade, the continued advancement of sales to the pottery industry and new industrial loads. Industrial sales were down 1.1%, domestic 1.8%.

Total sales of appliances amounted to £2,730,266 compared with £2,369,555 in 1957-58. The decline in sales of coke to industry made it necessary to reduce the quantity of coal used for gas making from 3,148,220 tons to 3,053,960 tons. There was a consequential increase in oil consumption, which reached a new record figure of 25,259,050 gal.

Southern

THE Southern Gas Board's deficit was £83,892 compared with the previous year's deficit of £205,155. Total sales of gas dropped by 1,724,411 therms or 1.5%. Sales to industry, however, were higher by 5.2%. Appliance sales increased by 34%, with a total of 24,170. Coke sales were 464,700 tons, a reduction of nearly 13%.

Coal carbonised was 1,089,300 tons, a decrease of 8.4% on the previous year. The average yield per ton increased by 1.1 therms. Of the total make 14.6% was from oil or refinery gas compared with 10.5% for the year 1957-58.

East Midlands

THE year ended for the East Midlands Board with a surplus of £153,014. Sales of gas at 291,997,000 therms showed a decrease of 1.19% compared with 1957-58. The reason was chiefly the recession in trade, particularly in the steel industry, which adopted a shorter working week. But sales to commercial consumers continued to in-

crease over their record level in 1957-58. Overall consumption per domestic consumer increased to 99.6 therms in 1958-59 from 98.4 therms in 1957-58. Cash value of appliances sold was £3,497,651, an increase of £727,086.

Coal carbonised during the year amounted to 1,504,645 tons, a reduction of 5.6% compared with the year 1957-58. In the Board's c.w.g. plants 4,390,214 gal. of gas oil were used, a reduction of 23.4% on the previous year; there was a substantial increase in the consumption of medium fuel oil in catalytic oil gasification plants, total consumption of the plants operating at Sheffield and Northampton being 5,361,073 gal.

and was incurred, the Board states, because of a recession in trade.

Gas sales dropped 2.13%, amounting to 345,634,000 therms. Coke sales at 1,354,409 tons were also down. But appliance sales were 23% up.

Of all gas sold 48.16% went to domestic users, 32.40% to industry, 15.66% to commercial users and 3.78% to public authorities. Industrial sales fell by 3.2 mill. therms or 2.8%, contrary to a continuous upward trend from ten years ago which has brought the amount of gas sold to industry from 72 mill. to 112 mill. therms a year. Domestic sales were 1.69% down.

The Board carbonised 3,848,593 tons of coal, against 4,004,200 tons in 1957-58 and gasified 15,619,302 gal. of oil, against 14¾ mill. gal. in 1957-58.

pared with 112,247,000 therms in the previous year. Sales of coke and breeze also dropped, from 634,735 to 591,740. The total value of appliance sales in the year amounted to £1,734,236 compared with £1,371,700 in 1957-58 when higher sale prices reflected the higher rates of purchase tax then ruling.

Coal used amounted to 1,217,465 tons, compared with 1,365,999 tons in the previous year. Petroleum light distillate used was 2,919,575 gal. against only 14,646 gal. in the previous year.

RESULTS SUMMARISED

North Eastern

THE North Eastern Gas Board disclose a deficit of £52,966. Total sales of gas at 139,641,116 therms were 2.7% lower than in the previous year. Some blame is apportioned to mild weather and trade recession.

Value of appliance sales was 20% above the previous year's, totalling £1,818,905. Inland sales of coke fell by 2.6%, but a record tonnage was exported.

South Eastern

THE South Eastern Gas Board report a deficit of £414,995, the blame for which is placed on a reduction in the sales of coke, increases in wages and greater interest and depreciation charges.

Sales of gas to consumers amounted to 271,256,953 therms as against 270,413,941 therms in 1957-58. Sales to domestic consumers showed an increase of 0.6%, and to commercial consumers of 1.8%, but there was a decrease of 2.7% in industrial sales. The total value of appliance sales was approximately £5,818,000 compared with £4,646,000 in the previous year.

Coal carbonised amounted to 3,217,646 tons as against 3,614,235 tons in the previous year. Oil used for carburetting amounted to 26,725,559 gal., as against 15,323,546. For oil gas, oil used totalled 6,078,442 gal. compared with 1,515,156 gal. in the previous year.

North Western

THE North Western Gas Board reports its first trading loss for seven years. Its deficit of £589,780 compares with a surplus of £532,134 in 1957-58,

Scottish

THE Scottish Gas Board announce a deficit for the year of £1,328,398. A decrease in gas sales of 5.1% is blamed partly on the continued fall in domestic consumption, but in the main on the industrial recession. There has also been a substantially reduced income from residual products.

The sale of gas to industry at 41 mill. therms showed a decrease of 11.2% compared with the previous year. But the value of appliances sold amounted to £2,099,971 an increase of 42.6%. Coke produced amounted to 1,121,145 tons compared with 1,195,173 tons in the previous year.

Coal used for gas-making was reduced by 5.7%. The use of gas-oil, however, was 12.2% higher.

North Thames

THE North Thames Gas Board's accounts show a deficit of £202,169. Sales of gas were lower, a total of 384,131,781 therms being sold. Total coke sales were also lower. Gas sold to industry was affected by the lower level of industrial production, but despite this more was sold than in the previous year. Sales of appliances amounted to £6,916,411 as against £5,224,707 last year.

South Western

THE trading loss of the South Western Gas Board was £124,374 compared with £209,431 in the previous year. Sales of gas totalled 110,526,000 therms com-

Wales

THE gross revenue of the Wales Gas Board for the year was £10,753,000, exceeding expenditure by £133,231. The Board sent out 104.59 mill. therms, 2.1% more than the previous year. Of this total 85.59 mill. therms were purchased from coke ovens, and 13.59 mill. therms were made at the Board's works.

Sales of gas increased by 2.6%, and sales of appliances increased from £1,104,916 to £1,689,481. Gas sales increased by the following amounts: To domestic users 1.1%, to commercial users 0.3%, and to industry 6.1%. Coke sold amounted to 85,390 tons, compared with 100,056 tons in the previous year.

Eastern

THE Eastern Gas Board had a surplus of £451. Gas sold decreased by about 1%, compared with the previous year; sales to domestic consumers declined by 0.8%, to industrial consumers by 0.2% and to commercial consumers by 2.3%. The Board sold 129,894 domestic appliances for the sum of £3,121,427 (108,459 appliances for the sum of £2,340,477 in the year 1958).

The Board carbonised or gasified 1,716,160 tons of coal during the year against 1,777,416 in the previous year.

The production of coke for sale decreased by 33,023 tons to 708,007 tons.

Northern

THE Northern Gas Board's surplus for year amounts to £563,008. Total gas sales for the year, however, decreased by 1.83%. The Board blames partly the 'reduced activity' in the industrial field and the milder weather. The total quantity of gas sold amounted to 168,254,713 therms. Sales of appliances rose during the year from 62,537 to 70,005, an increase of 11.9%.

Coal carbonised during the year amounted to 697,951, compared with the previous year's figure of 752,139. Gas oil used amounted to 9,801 tons and heavy petroleum oil 10,789 tons, compared with the previous year's consumption of 13,866 tons of gas oil and 2,142 tons of heavy oil.

POWER-GAS PLANT IN BELGIUM

Designed and engineered by the Power-Gas Corporation Ltd., Stockton-on-Tees, a Texaco heavy oil gasification unit and high pressure CO conversion plant commenced operation earlier this year at the factory of Societe Carbochimique S.A., Tertre, Belgium. The Texaco plant contains two gas generators, each to produce crude synthesis gas for 100 metric tons of ammonia per day. Both units have been commissioned and single unit operation is now at 110% of design rating. Sulphur is removed before the conversion plant, which is provided with a heat exchange system to make the plant self-supporting in steam when operating with a CO content of less than 2% in the converted gas. Our picture shows the condensate and oil/steam mixture pre-heaters.

COAL PIT HELPS GAS SUPPLY

ONE of the most modern coal-pits in the West Midlands area, Granville Colliery at St. Georges's, Shropshire, is to help the local gas supply. A pipe-line from the colliery is being laid several miles to Wellington, and gas from underground will be fed into the district supply.

A National Coal Board spokesman said that something like 2½ mill. cu.ft. of gas a week would be provided when the scheme is fully developed. At the moment the small amount of gas which is given off naturally through the working of the coal is dispersed through the return air system at the colliery. The Granville scheme for methane gas drainage will be similar to one already operating in North Staffordshire.

Swimming win

A team from Drakes of Halifax Ltd., captained by Mr. A. Hitchen, won the Drake trophy recently in the annual Halifax and District workshop squadron swimming competition.

Grants to householders explained by Gas Council

A BOOKLET which explains in simple terms the provisions of the House Purchase and Housing Act has been issued by the Gas Council. The Act provides for grants to be made to houseowners, whether freehold or leasehold, to cover part of the cost of installing 'standard amenities,' such as a bath or shower, hand-basin, hot water supply, water closet, and satisfactory facilities for storing food. One half of the cost will be covered by grant under the terms of this Act, up to a maximum of £155.

The booklet, *Good News for Houseowners and Leaseholders* explains in simple terms the workings and applications of the Act. It points out, for example, that in the case of leasehold property, the lease must have an unexpired term of at least 15 years and emphasises the point that people should not begin any improvement work until the local council has approved the application for a grant, otherwise the grant will not be forthcoming.

NEW N.T.G.B. RESEARCH CENTRE

A CONTRACT worth £1¼ mill. has been awarded for the construction of a research and development centre for the North Thames Gas Board in Fulham, London. Work has just begun on the six-storey building, which is to have a frame of pre-cast concrete and to have glass-clad curtain walling. Plans provide for laboratories, offices, welfare facilities and a training school in the new centre which, it is estimated, will be finished in two years' time.

It is understood that a permanent exhibition of gas appliances will be house in the completed building. The main contractor for the scheme is Trollope and Colls Ltd.

Warning bell for meters

THE North Thames Gas Board has been considering the cost of fitting a warning bell on prepayment meters, to ring when the gas is running out. The cost would be about £2 a meter. There are about 1,200,000 meters. The suggestion was adjourned for discussion by the Board's Commercial Committee.

Oil in them thar hills?

The possibility of an oil strike in Hampshire is being investigated at Chilcombe, just off the Winchester bypass. Work on levelling the ground started two weeks ago, and the British Petroleum Exploration Company has started building machinery on the site.

From a paper presented to a joint meeting of the North of England Section of the I.G.E. and the Coke Oven Managers Association (Northern Section) Durham, April 23.

Combined Operations in the Area of the East Coast Grid

By N. HENDERSON, A.M.C.T., Assoc.M.Inst.Gas E., A.Inst.F.,
ASSISTANT MANAGER, EAST COAST GRID, NORTHERN GAS BOARD.

IN reviewing the events of the last two years, since Mr. G. E. Anderson, General Manager of the East Coast Grid, presented his paper, 'Co-ordinated Production in a Grid Area' (Gas Journal 1957 **290** 286, a number of factors quite apart from the normal programme of development have occurred, requiring at times on the part of the grid a series of volte faces from the anticipated course of action to meet the completely altered circumstances.

Early in 1957 the effects of the Suez crisis were being felt, particularly in the uncertainty regarding oil deliveries and its consequent repercussions, resulting in the formulation of the policy, to operate all available carbonising plants to the optimum capacity, to increase b.w.g., producer and diluent gas to the utmost and to reduce the carburetting of water gas to the lowest figure practicable. These aims were affected by the stocks of oil and coke at the various works in each division at the time, and provision had to be made for anticipated increases in the demand for gas, and for coke by domestic and industrial users dependent in varying degrees upon oil. Plans were prepared in consultation with the industrial consumers councils for the maintenance of gas supplies to industry in order to maintain essential production and to minimise the effects which possible curtailment, delays or even the cessation in the supplies of oil might entail. The carbonisation department of the National Coal Board and other coke producers, collaborated closely with the grid in ensuring the maximum outputs of gas were available, although the production of hard coke was less affected, from all their plants.

Overall Saving

This of course, is now past history, and as is well known, the winter of 1956-57 proved abnormally mild, so that not only were all the requirements of gas demand met comfortably, but economies in operation far in excess of those which could have been anticipated even on the most optimistic basis, were effected. An overall saving of some 10,000 tons of oil on the planned economic usage was made, coal gas plants operated on a uniform base load factor, and coke oven gas intake was maintained at the highest level.

In contrast to 1957, the winter of 1957-58 while not particularly severe, extended well into March and April of 1958, with snow and hard frosts occurring much later than is usual. Gas deliveries were maintained at a high level during these months, and in certain cases delayed the period at which base load plants could be laid off for essential repairs during the summer. As a matter of interest, gas deliveries for the grid area during March 1958 totalled 3,864 mill. cu. ft., or 23.5% above the figure for March 1957.

Production Difficulties

Turning to the more recent events of the current year, there has, since the early spring, been a slight but noticeable trade recession, most marked in those industries which most affect our own industries of gas and coal, namely the iron and steel trade, shipbuilding and certain light industries within the area. The Coal Board were the first to feel the effects of the recession to a marked degree, in that the demand for metallurgical coke was reduced sharply and the stage was rapidly reached when the stocking of coke had to be resorted to. Following this step, which unfortunately has continued, the curtailment of production by all economic means had to be effected, and in fact a number of the older coke ovens had to be shut down. As far as those batteries supplying gas to the East Coast grid are concerned, both the N.C.B. and other producers have made every possible effort to maintain deliveries from these ovens at their normal level, and any reductions which have been made have been by way of advancing scheduled dates of programmed repairs, generally though not entirely ceasing the oiling of charges, and the grinding of coal to improve quality. Whilst these reductions have in total resulted in an appreciably smaller volume of coke oven gas from that planned, and must in the event of a severe or prolonged winter have had a serious effect upon the estimated financial results, as well as in the ability to meet the peak demand the Gas Board has appreciated to the full the economic and practical difficulties which faced the coke producers and has collaborated at every stage to meet their requirements.

The N.C.B. has in turn demonstrated in no uncertain manner their confidence in the future of their carbonisation activities by proceeding strictly according to their original programme in the construction of their new Murton plant, lighting up and charging the new ovens precisely on schedule.

It should also be stated that throughout the difficult period, despite the reductions referred to above, deliveries of gas overall, from all N.C.B. ovens supplying

the grid, have, on every day apart from the Christmas to New Year period, when diversions and reductions are inevitable, well exceeded the contract quantity laid down in the Agreed Scheme.

The gas board has in like manner showed confidence in the future in placing the various contracts and proceeding with the foundation and constructional work of its new 8 mill. cu. ft. per day i.v.c. plant at Hendon, which project will be referred to more fully later in this paper.

During the past two years, numerous minor extensions and improvements have been made to the grid network, but the most important scheme has been the laying of some 35 miles of 15-in. and 12-in. main linking the new Murton plant to the Sunderland and Hartlepool interlink, and southwards to Darlington via Spennymoor, interconnecting with the existing Brancepeth-Darlington main. This scheme was completed before the heating up of the Murton battery and some 43 mill. cu. ft. of Brancepeth gas passed along this main to Murton according to a pre-arranged programme.

Remote Control

Another scheme inaugurated by the Sunderland Division, provides for the remote control of certain units in the division from Chester-le-Street, and the project for the Durham Unit is now almost complete. The stocks, inputs and district pressures at Durham are remotely controlled from the Sunderland grid centre at Chester-le-Street, and is typical of the possibilities which exist at several points in the grid for this type of installation.

Comparing the production availability changes in the past two years, with the corresponding figures given in the earlier paper, the following changes shown in Table 1 have taken place in the gas availability in the grid area (the figures are in mill. cu. ft. per day).

TABLE 1

Type of gas	Sources	Increase	Decrease
Coke Oven Gas	Sadler & Co.	1·0	
	N.C.B. Murton	7·5	
	N.C.B. Derwenthaugh		1·5
Coal Gas	Elswick	1·7	
	Redheugh		3·5
	S. Shields		2·0
	Hendon		1·5
	Ayres Quay		1·0
	Darlington	0·7	
C.W.G.	S. Shields		1·0
Oil Gas	Redheugh	6·0	
		16·9	10·5

The nett increase in availability is 6.4 mill. cu. ft. per day or 4.2% of the maximum day delivery in two years, an increase in availability gives little room for complacency, and could readily be absorbed by a prolonged spell of severe weather. It will be noted that there has been a net reduction in coal gas availability of just over 5 mill. cu.ft. per day—mainly due to the closing down of the older horizontal installations—which had been offset by the new oil gas plants of the Onia-Gegi type at Redheugh. The reasons for this change, quite apart from the financial aspect, will be readily understood when the questions of flexibility and daily, weekly and seasonal variations are discussed, but it should here be pointed out that the balance of base load/peak load plant will be redressed by the new i.v.c. installation of 8 mill. cu.ft. per day capacity, which will come into operation at Hendon in 1960-61. The choice of this plant quite apart from the strictly economic one of yielding the lowest cost per therm when on a satisfactory load factor, was also based on the availability close at hand of specially suitable coal, and the need for increasing the production of coke to meet the growing demand in the Sunderland and South Shields areas. It is too early for a description of the new plant to be given here—but from the grid point of view the siting of the new plant in the Sunderland Division which already includes Murton, Lambton and Stella Gill coke ovens within its boundaries, creates problems of gas distribution which will be accentuated in the summer months, but even on the maximum day in winter it is estimated that there will be a surplus of between 7 and 10 mill. cu.ft. per day, dependent upon c.w.g. production, available for transfer to other divisions.

Turning to the problem of coke oven gas availability, Table 2 below summarises the position today compared with two years ago so far as N.C.B. plants are concerned—there has been no material change in the volume received from other suppliers apart from the 1 mill. cu.ft. per day addition from the new Randolph battery.

TABLE 2

Plant	Contract quantity	Average daily volume received, mill. cu. ft. per day	
		Feb. 1957	Feb. 1959
Derwenthaugh	11·5	11·73	9·86
Monkton	10·25	10·63	9·74
Norwood	5·1	5·73	5·70
Lambton	7·0	7·93	8·02
Stella Gill	3·3	3·49	3·69
Murton	7·25	—	7·26
Fishburn	7·25	7·86	7·57
Trimdon Grange	2·7	3·02	2·66
Brancepeth	5·9	6·17	6·33
Total	(53·00) 60·25	56·56	60·83

Policy Review

The first point, which stands out clearly, is that although in both years the contract quantity has been exceeded, the increase in availability anticipated with the advent of the new Murton plant, has not materialised and instead of an increase of at least 7.25 mill. cu.ft. per day in gas availability, we have actually only received an additional 4.25 mill. cu.ft. per day. It will readily be understood that a deficiency in the planned availability of practically 3 mill. cu.ft. per day, coupled with a reduced input from other sources, is most serious from the operational aspect alone, particularly in meeting the peak winter demands, and has required a review of policy by the Gas Board on the programme of closure or curtailment of production on the older and less economical and efficient plants.

With the figures for earlier years extracted from Mr. Anderson's paper as a basis, Table 3 shows, when the temporary reductions due to repair programmes are

TABLE 3

Calendar year	1955 mill. cu. ft.	%	1956 mill. cu. ft.	%	1957 mill. cu. ft.	%	1958 mill. cu. ft.	%
Coke oven gas	19,240·5	53·8	21·588.6	59·2	23,916·9	66·4	22,934·5	62·7
Coal gas	12,247·2	34·3	11,007·5	30·2	9,584·4	26·8	10,194·6	27·9
Water gas	3,743·8	10·5	3,253·7	8·8	1,436·2	4·0	2,236·5	6·1
Other gas	489·3	1·4	656·9	1·8	830·6	2·3	1,200·5	3·3
Total	35,720·8	100	36,506·7	100	35,758·1	100	36·566·1	100

ignored, the continuing trend of coke oven gas availability to increase and for c.w.g. to be eliminated as the principal means of attaining the desired level of flexibility.

A feature of interest is the increase in 1958 in the volume of production of 'other gas' in which is included the oil gas produced at Redheugh on the plants referred to earlier. The advantages of this type of plant compared with the more normal coal gas plants, are briefly lower capital costs, greater flexibility and a lower cost per therm on all but the most modern coal gas plants. The plant is comparatively costly to restart after a stoppage, and it is therefore policy to keep the plant running, when once at work, for as long as possible. It is ideal to operate on the 'five day week' principle, being started up on Monday morning and working through until Thursday or Friday; in this way it materially assists week-end production flexibility problems.

Variation in Demand

If at this stage we look a little closer into this question of attaining the desired degree of flexibility to meet the wide variations in demand which are encountered, we shall find at once an important common ground for 'combined operations' and see how by close co-operation and co-ordination we can best meet these variations. First, looking at the variations in demand which are encountered we find that flexibility is required to meet three basic types of variations.

1. Hourly variations due to the habits and operations of consumers whether domestic or industrial and to meet which, is the primary function of holder storage.
2. Week-day/week end variations due primarily to the cessation of industrial demand and variations in domestic activity; this again can largely be met by adequate storage facilities as well as a limited trimming of production.
3. Seasonal variations—not only in the anticipated differences between summer and winter demands for which planned adjustments in available plant are made, but the quite rapid variations in demand which can occur at any season of the year caused by changes in the prevailing weather.

The gas engineer, and the grid in particular, is continually trying to anticipate and forecast weather conditions for sometime ahead, and to make the required changes in production rates at precisely the right time. The problem of the grid in the case of (1) and (2) is accentuated by the high percentage of base load gas from coke ovens which operate on an almost constant load factor, and which has only a limited degree of flexibility by diversion of gas to boilers where this can readily be done.

In gasworks, c.w.g. and oil gas plants provide the principal means of varying production levels, and during the winter this is generally adequate and the requisite variations can invariably be attained without resort to reductions on coal gas plants or at coke ovens. For eight months of the year, however, from April to November, these plants are not required except perhaps to avoid excessive stock loss early in the week, and at week-ends production variations are limited to the boiler diversions referred to and when this is inadequate by reductions on coal gas plants—the flexibility available by this means will be discussed later but it is fairly limited and the principal and most economic method is by week-end scurfing.

Ignoring the four weeks affected by the industrial holiday, whereas the volume of coke oven gas taken only varies between 92 and 100% availability, c.w.g. production varies from zero to 100% availability as is to be expected, but in addition coal gas is cut to 36% of its normal maximum level even with the corresponding reductions of coke oven gas. The grid, therefore, has quite a problem to maintain a reasonable load factor on its base load plants and certain coal gas plants have to be shut down completely during the summer to ensure an economic working level for the remainder.

Holder Capacity

The total capacity of conventional type holders in the grid area is 63.5 mill. cu.ft., equivalent to 41% of the maximum day delivery—the recent addition of 10 mill. cu.ft. of underground storage at Billingham has increased this to 73.5 mill. cu.ft., or 48% of the maximum day. Though it is a popular supposition outside the industry that the ability to store gas in holders plays an important part in smoothing out peak demands and in solving production problems, it is only true of the hourly fluctuations, and to a limited degree of the day to day variations which occur; a close watch has in fact to be kept to see that daily gains or losses from storage are reasonably in line with planned variations.

Of the available holder capacity, a proportion, which varies from one undertaking to another, is required: (a) to meet hourly variations in demand, (b) to provide for daily variations and for the ratio between week-day and week-end deliveries, (c) to allow for the time lag in increasing or decreasing rates of production, (d) to permit the carrying out of repairs and the planned shutdown of supplies, and (e) as an insurance against breakdown.

Under present conditions at certain works, particularly

at the smaller holder stations, as much as 50% of the maximum stock may be unavailable due to district pressure requirements, but it is policy, wherever practicable, to use the whole of the gas in holders by using boosters or injectors and by high pressure distribution.

The critical period, when stocks are normally at the lowest, is on Friday evening and a target has been established for all divisions to try to attain a minimum stock of 40% (in winter) or 30% (in summer) of their maximum stock, on Friday evening. These levels can vary slightly between one division and another, dependent upon the ratio of week-day/week-end deliveries, but have been found in practice to give reasonable margin for a breakdown in any one division and to allow sufficient room in holders to take the week-end surplus.

The importance of a breakdown occurring between midday and midnight on Fridays with stocks so reduced cannot be stressed too strongly, and if such a breakdown occurs at a coke works which is a large base load unit, the effect is the more pronounced, the more so since in many instances districts and consumers are fed direct from the mains carrying purified coke oven gas to the various gasworks. The question of providing improved facilities for the rapid transfer of gas in such circumstances is now being actively pursued, and when finalised may afford the opportunity of further utilising holder storage. The geographical location of Lambton, Murton and Hendon, all at the centre of the grid network, will play an important part in providing the source of such emergency transfers.

Potential Flexibility

The new underground storage will provide a rather different technique in operation from the conventional storage, in that it is intended that the well shall be continuously evacuated from Monday morning until Friday evening and then be continuously filled over the week-end. This means that it will be possible to retain a larger volume of gas in the conventional holders and district pressure problems should be reduced, by taking out a greater proportion from the underground well during the daytime. It is also hoped that it will improve facilities for maintaining production at a more constant level at the week-end.

The potential flexibility of manufacturing plant is of the greatest importance and the best method of working each type of production plant must be carefully worked out.

1. *Coal gas.* (a) Scurfing. By operating a regular scurfing schedule at week-ends particularly during the summer, a flexibility of some 10% to 15% of the coal gas plant at work is possible. Since the rated output of the plants at work varies from 18 mill cu.ft. per day in summer to 35 mill. cu.ft. per day in winter, this gives a possible week-end reduction of approximately 2 to 3.5 mill. cu.ft. per day respectively, although this latter figure will usually at the peak season have to be replaced by c.w.g. or oil gas. (b) The gaseous firing of settings by coal gas or coke oven gas is comparable to diverting gas to boilers at the coke works and simply means that carbonising coal is being used as fuel instead of coke or breeze. (c) Reduced throughputs result in the loss of thermal efficiency and in operational difficulties, so wherever possible the plant at work should be operated at its optimum production level.

2. Oil gas. This type of plant operates at its highest efficiency on continuous running. Since the cost of restarting after a stoppage is high the aim should be to run the plant from Monday to Friday to give a good week-day/week-end flexibility.

3. *Carburetted water gas.* This plant gives the widest variation in output from zero to maximum at short notice, but it is the most expensive gas to manufacture. Capital costs are particularly high and the plant is costly to keep under fire, as standby, whilst continual stopping and starting results in the loss of thermal efficiency and a waste of manpower.

The total flexibility available to the grid in terms of volume can be summarised according to the season of the year, as Table 4, constructed on a week-day/week-end basis, shows the reductions, which are economically practical, to meet the lower week-end deliveries.

By using our combined resources, varying rates of delivery can be met although practically the whole of the responsibility for flexible operation has to be borne by the gas board plants. In winter time, with all base load plants fully extended, there is little that can be done at the coke ovens to give appreciably larger volumes. Any steps which are taken, *e.g.*, by oiling or by heavier charges, may be nullified by increased heating requirements on the battery. Consequently, the cost borne by the gas board of each increment of production is correspondingly higher. Although it is almost impossible to determine with complete accuracy the cost of the small volumes of gas made on plants held in readiness to meet the final peaks of demand, it is possible by considering carefully each item of plant and taking into account both for operation and standby purposes the labour and fuel required, the ancillary plant necessary and the capital charges attributable, to arrive at a close approximation.

Clearly for any particular plant, the cheapest gas is produced when the plant operates on a 100% load

TABLE 4

	Winter			Spring and autumn			Summer		
	Normal daily production	Reduction at weekend	%	Normal daily production	Reduction at weekend	%	Normal daily production	Reduction at weekend	%
Coke ovens	72·6	−8·0	11·0	66·6	−7·0	10·4	64·6	−7·0	10·8
Coal gas	34·7	−3·5	10·0	19·0	−2·0	10·0	17·5	−1·7	10·0
Oil gas	6·0	−6·0	100·0	3·0	−3·0	100·0	—	—	—
C.w.g.	39·0	−39·0	100·0	15·5	−15·5	100·0	—	—	—
Stock gain	—	9·4			11·4			13·8	
u/g		4·5			4·5			4·0	
Total	152·3	70·4	46·1	104·1	43·4	41·3	82·1	26·5	32·2

factor throughout the year, and it follows, therefore, that the cost of gas produced on a plant which operates for only a few days in the whole year will be extremely high. However, the volume of gas so produced is relatively small in comparison to the annual volume of gas made and purchased, so that the increased cost, spread over the whole volume is also relatively small. No economically effective solution to this problem has yet been found which has not disadvantages, *e.g.*, holder storage merely to meet seasonal variations is uneconomic, while a process such as accelerated carbonisation is not only insufficiently flexible on a day-to-day basis but also reduces the thermal yield.

Alternative means of underfiring coke ovens, with the consequent release of larger volumes of rich gas when required may be considered as a means of meeting peak loads. The Wales Gas Board in its South Wales grid, uses it almost exclusively, while other boards use lean gas firing as an additional base load production in the winter months with c.w.g. and other gas as the final peak load addition. A study of the week by week deliveries for 1958, with lean gas firing incorporated for six months of the year at Monkton, Fishburn and Brancepeth coke oven plants shows that this could give an improved load factor to base load coal gas plants; older plants which have been brought into operation in the past only during the winter could be eliminated, and the volume of peak load production reduced. It also gives some manœvreability to both the Coal Board and the Gas Board in dealing with the coke market, and gas could be made at selected plants of either board according to coke requirements at the particular time.

National Fuel Policy

The high cost of coke chargeable to lean gas firing has militated against the adoption of this method in the past, but it may well be that coke market variations or a national fuel policy could radically change the situation. Alternative means of underfiring, *e.g.*, oil, tar or gas made from breeze or low rank high ash coals might make the proposition more attractive in the future.

The starting up of the new plant at Murton with its output of some 7.5 mill. cu.ft. per day of gas put into the grid, together with the impending completion in 1960 of the i.v.c. plant at Hendon with its capacity of 8 mill. cu.ft. per day, has given an entirely new aspect to grid operation and development to that envisaged at the time of its inception. Originally the grid was designed so that each division should be more or less self supporting, and that grid interlinks should be used for the transfer of only marginal quantities of gas to improve the load factors and efficiencies of plants in operation and to a smaller extent as an insurance against breakdown.

From 1961 onwards the Sunderland Division, more or less geographically at the centre of the grid, will have within its boundaries a base load capacity of 26.5 mill. cu.ft. per day and with c.w.g. 32 mill. cu.ft. per day, while its present maximum daily delivery is only 19 mill. cu.ft. per day. Although by 1961 this may have increased to 20 mill. cu. ft. per day, there will still be a surplus available at the peak delivery of 6.5 mill. cu.ft. per day base load, or 12 mill. cu.ft. per day in an emergency.

As referred to earlier, provision has already been made for the gas from Murton to be diverted southwards to pass to the Darlington and Tees-side divisions, and it is only because the construction of the new Hendon plant has made base load production there impractical, coupled with the mild weather this spring, that it has not already done so on a large scale. Although these links are adequate at present for the transference of gas southwards, so long as Murton is operating, there is no means at the moment of passing gas from these divisions northwards to meet a major breakdown in Sunderland or Tyneside, or to dispose of any surplus base load production in the south.

Links would therefore appear desirable (a) from the Murton-Darlington main through Durham to Chester-le-Street and beyond if required, and (b) between the Lambton and Murton mains through Hetton and Houghton. This gas could pass from either Tees-side through Hartlepool, or from Darlington, to the north to give the desired transfers in either direction, as well as a degree of insurance against breakdown which is at present lacking.

Interlinks

Turning to the problem of transferring gas from the Sunderland Division to Tyneside or vice versa, with improvement in the link between Chester-le-Street and Redheugh, there will be adequate facilities for transfer of gas northwards, but not in the reverse direction. On the east side of the two divisions there is greater scope for the transfer of gas from Sunderland to the South Shields and Jarrow areas, at present primarily dependent upon Monkton. Improvement of the interlink between Hendon and Ayres Quay, and of the main through Cleadon to the north will enable the requisite quantities of gas to pass to these areas, where it can best be utilised.

The provision of these new or additional interlinks will not call for any change in the policy in the operational control from the grid centre or any increase in instrumentation. The remote control of interlink valves and the transmission of meter readings at divisional boundaries will continue to be located at the principal units of those divisions most conveniently equipped to deal with them. Only if it is later found to be economically or operationally advantageous to transfer such information or control to Chester-le-Street will this be considered.

For the time being the instrumentation layout at the grid control centre will be concerned primarily with production rates; first from each coke oven plant supplying gas to the grid, and later from the principal production stations. The third stage envisaged is the transmission of stock levels from each works and holder station, probably by the Telex method of dialling from divisional centres rather than by direct transmission from individual holder stock indicators.

The first stage, for which a trial panel has been on test for nearly 12 months with Monkton as the pilot scheme, incorporates the rate of delivery of gas from each coke oven plants by transmission of the actual meter integrator, together with meter temperature and pressure, the calorific value from the official measuring instrument, and the pressure at the outlet of the compressors, where the coke ovens plants are delivering purified gas. In addition to assisting in the technical and operational control, this information will give the corrected volume

of gas delivered at S.T.P. and give an authoritative basis for the checking of monthly invoices.

These figures recorded at hourly intervals, with similar figures transmitted from each manufacturing station, taken from each meter recording the gas produced, and an hourly summated stock for the division transmitted verbally or by dial coding, will give an hour by hour picture of the daily trends of production, delivery and stock in each division. Taking into consideration rates of transfers between divisions, the grid will enable an accurate forward assessment of the stock position to be made the following morning and will be provided with a sound basis for determining the following days' operations so that with steadily accumulating experience, grid operations will become more and more a precise technique.

Weekly Programme

From the inception of the grid the general method of operation has been on a week by week basis, and a programme is issued to divisions each week showing the anticipated daily production, transfers between divisions and stock each morning, commencing from 6 a.m. each Monday. These programmes are based primarily on each division's own estimate of its delivery of gas throughout the week, determined according to information it receives from its larger industrial consumers of their anticipated requirements, and an assessment of the effect of the prevailing weather during the period. This latter variable is the prime reason for making changes in the planned programme of operation—given stable temperature conditions it is quite practicable to give an accurate estimate of what the output will be on any particular day according to the season.

Earlier in the paper reference was made to the slight but nonetheless definite recession in industrial activity which has been evident since the spring of 1958. It is not normally part of the grid's activities to maintain detailed records of the gas taken by the various classes of consumer and such statistics as it may require from time to time are obtained from divisional and board records. At the same time the grid must be always vitally interested in the trends at any particular time for in the aggregate they have an important bearing on future grid activities.

Success or Failure

More and more in the future as competition becomes keener, the price of our products will be the key to our success or failure, and it is only to make this point as clear as possible that it is mentioned here. Since so large a proportion of our gas comes from coke ovens and our operations are largely geared to keep the intake at as high a level as possible, it is by our combined operations to use coke oven gas with such flexibility as to avoid uneconomic working of other production plants and to meet peak demands, that we can achieve the greatest economy. It is very easy to lose any advantage there may be, on the price level, in taking coke oven gas, if coal gas and other plants are kept manned, under fire and on low load factors in consequence.

A whole paper could be devoted to the subject of purification, and many have indeed been written on its various aspects. It is proposed here to study some of the lessons to be learned from experience since the inception of purification at coke oven plants.

The main difference in practice as between gasworks and coke ovens is essentially one of the load factor. At gasworks, purifier units are usually of smaller capacity—in this area 4 to 5 mill. cu.ft. per day is the standard—and there are usually two or more streams, according to the size of the works, to handle the gas made. At coke works, on the other hand, there is normally a single installation to deal with the whole of the gas to be purified, and quite often these are working at above the rated daily throughput.

Again whereas coke works purifier installations work at a load factor of 100% or more, with the exception of perhaps the industrial or statutory holiday periods, the throughput in gas works is variable as between one stream and another, and frequently during the summer, certain installations may be rested completely. Certainly during the major part of the year there is a reasonable margin between the rated and the actual throughputs, and consequently there is not usually the same concern as to the ability to maintain purity when a box is being emptied.

Different Technique

This marked difference in operating conditions at coke oven plants calls, therefore, for a rather different operational technique, and all boxes must be kept in a more active state at all times—any noticeable falling off must be quickly remedied if purity is to be safely maintained. Only recently and still only in certain cases, has provision been made for the storage and preparation of oxide under cover, and in the past lack of this facility has prevented complete preparation of the oxide which has perforce had to be charged into boxes with far too high a degree of moisture. The result has been that the oxide has not been fully active, back pressure troubles have developed, and there has been an accumulation of batches of partly spent oxide which have been difficult to work up to saleable strength. This latter aspect has not been assisted by the almost precipitous fall in demand for sulphur, so that it has frequently not been possible to dispose of that oxide which has been available for sale, and stocking has been resorted to.

A close scrutiny is made by the grid of the quarterly costs of purification. It is interesting to note that there is usually a marked reduction in the summer quarters although frequently the same number of boxes are emptied and refilled. The higher cost in winter has usually been attributable to the increased use of steam and power which together form an appreciable proportion of the costs of purification, and it is well worth investigating the possibility of using exhaust or pass-out steam, which could materially reduce costs.

Two years ago the use of Manox was tried for a 12-month period at Fishburn, although the higher initial cost of the material kept the overall costs constant, its higher re-activity reduced the number of boxes emptied and refilled. Particularly during the winter months at a time of increased throughput of gas, there were fewer reductions from overloading the boxes and

less difficulty in maintaining purity when emptying boxes.

During the year just completed it was agreed to supply Manox to meet the yearly requirements for new oxide at all coke oven plants, and this material has been put into use to meet the past winter loads at all but two works. It is still too early to obtain a complete picture of the results of this decision, but it is apparent from the evidence to date that there has been a reduction in the number of boxes emptied and that throughputs have been maintained at a higher level with less difficulty in maintaining freedom from H_2S, than in the corresponding month of last year.

Toxicity Standard

Considerable research and enquiry has been recently undertaken on a nation-wide basis to determine what standard, if any, can be laid down for the toxicity of town gas and to minimise the effect of the CO content without too seriously affecting the combustion characteristics. This is extremely difficult in view of the variations in composition of gas from different types of plant. Finality has not yet been reached, but there are very considerable variations which occur in the constituents of the gas distributed in the grid area. As the proportions of gas manufactured on the various plants vary according to the season, so the analyses and characteristics of the gas vary, and it is a function of the grid to try to obtain as much uniformity as possible both in the chemical composition and in the combustion characteristics.

The formation of gum in town gas is one of the serious problems that face the distribution engineer, (a) by deposits on district and service governors, rendering them sluggish and sometimes inoperable, and (b) by the blocking of small bore orifices of appliances, e.g., bypasses, thermostats, etc. Liquid-phase gum formed by certain unsaturated hydrocarbon constituents of the gas, is largely eliminated by benzole washing, but vapour-phase gum, formed by the interaction of oxides of nitrogen with certain hydrocarbons in the gas, is the most difficult to prevent or remove.

Growing Problem

Within the grid area experience has shown that the incidence of gum troubles is confined largely to those areas which receive gas direct from coke ovens, but it must also be said that all areas so supplied do not have trouble to the same extent, and in certain instances no such difficulties have been reported. Furthermore, even from a single particular source the difficulties are not continuous, but vary in degree, although conditions of production and distribution appear unchanged and weather conditions are comparable. Nevertheless the problem is serious and, with the increase in the number of districts supplied direct from grid mains, is liable to grow still more serious in the future. We can briefly summarise the steps we can take, as a combined operation to minimise gum formation or to effect removal before the gas leaves the works:

1. *Prevention.* (a) Minimising the formation of nitrous oxides by close control of carbonising conditions and operations, in particular in the admission or leakage of air or waste gas; (b) control of the producer gas dilution plant, in which the production of nitrous oxides is higher—it is evident from past experience that gum forming bodies are present in greater volume in gas which has been diluted by producer gas than in straight coke oven gas.

2. *Reduction.* By the admission of steam or water to the gas stream, washing out the condensible bodies; (b) by the installation of dri gas plant, and (c) by passing the gas into a holder of sufficient capacity whereby time is allowed for condensation and deposition of the gum already formed.

The stress laid by Mr. Anderson on the importance and implications of the siting of official testing stations at coke ovens is none the less important today and in fact with the additional testing stations approved in the last two years, the volume of purified gas passing into the grid has increased. The greater proportion of this gas passing direct to districts or to individual consumers without entering a gasworks or holder station, throws a greater responsibility upon all concerned to ensure that the correct c.v.—neither higher nor lower than that declared—is maintained.

Discrepancies

In the event of any divergence from the declared c.v. there is frequently little that can be done, at gasworks, to correct the discrepancy, and either gas may pass direct to a district at less than the declared c.v. with the possibility of a prosecution and a penalty resulting, or, gas may be sent out at a high c.v. with resultant loss of revenue to the Board. In either case considerable trouble and technical difficulty may also be caused on consumers premises. Similarly and equally important any failure completely to remove H_2S in accordance with the official Gas Referees test may have similar consequences.

Yet another aspect of any failure in our combined operations is that of a sudden cessation in deliveries which unless sufficient warning is given to the grid and the division concerned, may denude districts or large consumers of gas, with the most serious consequences. These brief comments show clearly why the grid as primarily involved with the purchase and allocation of all coke oven gas is so concerned to ensure the collaboration of all involved, to effect the delivery and distribution of gas of precisely the correct c.v., free from deleterious constituents and at the required pressure.

Load Differential

It is perhaps unfortunate that during last winter there were no protracted periods of severe weather—and, as in the winter of 1956-57 no abnormally high daily or weekly deliveries were achieved. Insofar as the present operational trends are concerned there has been a noticeable variation in recent months in the week-end load factor, in that the differential between the week-day and week-end deliveries is now appreciably reduced. Formerly the Sunday delivery was invariably considerably higher than that of Saturday—quite often it was almost equal to Friday's delivery. Now, the trend is for Saturday and Sunday deliveries to be lower in proportion and more nearly equal, indicating that Sunday

work has been cut down or eliminated, and that night working on Sundays to prepare for full production on Monday morning is now less prevalent.

There is also the tendency for the statutory holiday period to be extended, e.g. at the New Year, few firms operated on the day after New Year's Day, and several firms were closed down or on reduced work for the period between Christmas Day and The New Year. Compared with last year when there were two full working days after the New Year, this considerably reduced deliveries and made grid operations all the more difficult although in the planned programme the effect of the four days holiday was anticipated and allowed for with minimum reductions everywhere.

Both the gas and coking industries are watching keenly the increased competition from oil which can so vitally affect our future development, but as has been pointed out the result will depend upon our combined operations to put on the market highly refined fuels at a competitive price. One point of view lately coming into greater prominence, is whether uncontrolled competition can be allowed to go unchecked—can the nation indefinitely allow its natural resources to be unused in the search for cheaper alternatives or must a national fuel policy—for so long an unheeded cry in the wilderness—at last by force of circumstances, be evolved for the best utilisation of the coal we possess in such abundance?

GAS ON THE CONTINENT

Continuous Vertical Chamber Ovens in Gasworks

SINCE the installation of the first continuous vertical chamber ovens in the Dresden gasworks in 1910, about 200 of these ovens with throughputs from 6 to 14 tons in 24 hours, have been installed in gasworks. The necessity of installing at the same time special coal preparation plant limited their popularity for town gas production purposes, but 345 of these chamber ovens were built for industrial purposes, mainly for the production of synthesis gas.

The Danish gasworks of Aalborg, where one continuous chamber oven had been erected in 1936, decided after the war to extend the plant. The chambers are arranged in two rows and fired by producer gas from a central gas producer plant. Each of the 12 chambers has the dimensions of 8 ft. 4 in. by 1 ft. 8 in. by 26 ft. 8 in. The upper two-thirds of each chamber are tapered from 20 in. to 9 in. in width.

The waste heat is utilised in a tubular recuperator which is simple and cheap to construct. It allows a temperature below the 300°C. limit to be utilised effectively by the use of special refractory bricks.

Superheated Steam

Fuel gas and primary air are preheated in the recuperators and enter the oven flues at the top where they can be controlled by dampers. The coal passes from the distillation zone of the upper third to the water gas formation zone of the second third, while the bottom third is not heated and allows the coke to cool off before it enters the discharge cylinder and quenching chamber. Superheated steam enters the chamber just above the discharge cylinder. The coke passes by way of a measuring drum directly into a tilting bucket conveyor which transports it to the grading plant.

The chambers are charged from the hopper through manually operated quadrant gates. The new plant has carbonised coal consisting of two-thirds of Durham and to one-third of either Ruhr or U.S.A. coals. The nominal throughput of each chamber is 8 tons in 24 hours. Although the average load was only 76% of the nominal load, one block of 12 chambers produced 4.83 mill. cu.ft. of gas of a calorific value of 503 B.t.u. per cu.ft. The yield averaged 18,165 cu.ft. per ton of coal carbonised. Underfiring requirements were 1,346 B.t.u. per lb. of coal, allowing for a coke of 10% moisture and 5.8% ash and a producer efficiency of 75%.

W. Zankl. Das Gas-und Wasserfach. Vol. 99. No. 48. December 5, 1958, p. 1262.

Flexible Connections for Gas Appliances

DOMESTIC gas appliances have, in the past, suffered from the lack of a good, reliable and safe flexible connection which would give gas washing machines, refrigerators and other appliances the same mobility as is accepted for electrical appliances. Such a connection should offer a much greater safety than is possible with the ordinary flexible gas hoses, and should incorporate a coupling similar to an electric plug and socket.

The many difficulties appear to have been overcome successfully and the Committee for Utilisation at the German Association of Gas and Water Engineers has agreed to the introduction of this important new development. Care has to be taken that the flexible hoses are not left too near the flue gas outlet ports, particularly in the case of gas cookers which have a multiplicity of outlet port arrangements. An illustration showed a flexible gas hose with gas plug and socket as produced by Messrs. Tuboflex K.G. of Hamburg-Altona, Barnerstrasse 16.

The plug can be withdrawn from the socket only when the gas tap is shut. With the plug removed, the gas cannot be turned on. All plugs are interchangeable and the hoses are supplied in lengths of 20 in., 30 in., 40 in., 50 in., 60 in., 80 in., and 90 in. The safety gas hose consists of a metallic flexible tubing with rubber cord

sealing covered with P.V.C., carrying on one end a hexagon nut with ½ in. internal thread and on the other end the safety gas plug. An illustration showed how the bayonet pins engage in a recess so that the plug cannot be withdrawn as long as gas flows. The cover plate allows only the bayonet pins to pass so that children cannot interfere and open the socket. Similar equipment is also made by Metallschlauchfabrik Pforzheim, of P.O. Box 51, Pforzheim (Baden).

W. Stehn. Gas-Wärme. Vol. 7. No. 11. November, 1958, p. 381.

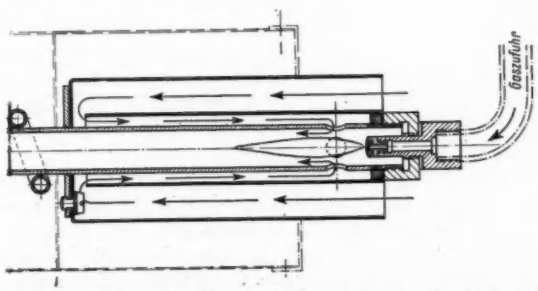
Domestic Refrigerators

BOTH the production and the sales of electric domestic refrigerators in West Germany have risen rapidly since 1950. Gas refrigerators have lost ground mainly because the gas undertakings did not push this side of their business and adhered to a few well-tried types which could not compete against the electric appliances in price and running costs. None of the gas appliances possessed a thermostat, which was fitted to all electric types as a matter of course. However, in the last few years the efficiency and the refrigerating capacity of absorption type refrigerators has been improved tremendously.

The new Schlegel burner, shown in the illustration, has improved the gas consumption by 30% to 40%. The combustion air is preheated as it flows through the outer mantle. The down-draught arrangement automatically adjusts the primary air flow to variations in demand, specially when the flame is low, and reduces excess air. The ceramic jet is easily exchangeable; its orifice for town gas operation has a diameter of .03 to .04 in. The rated gas pressure is approximately 1¼ in. w.g. The burner is preceded by a diaphragm-type of reducing valve which can be set to hold the rated pressure at mains pressures from 6 in. w.g. down to 1¾ in. w.g.

Instead of the manual setting of the regulation, thermostats are now available, which are simple, robust and cheap. They are based on a capillary tube, filled with chlorethylene, which operates a diaphragm-type of control valve and automatically controls the gas flow to maintain the refrigerating capacity required. Deep-freeze compartments are also now available so that it is claimed that modern gas refrigerators can be sold which are equal in performance to electric models and at the same or only slightly higher prices.

W. Schirp. Das Gas-und Wasserfach. Vol. 99. No. 25. June 20, 1958, p. 601.



Schlegel burner (shown horizontally, to be installed vertically). Gaszufuhr—gas inlet.

Gas Baking Ovens

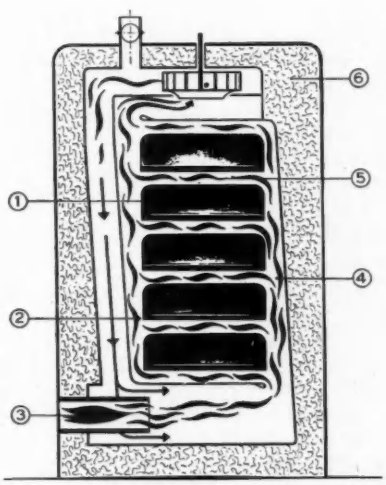
THE International Baking Oven Exhibition which took place in Munich in May, 1958, revealed that the German baking industry has had serious difficulties in finding the necessary manpower, particularly apprentices. There is, therefore, an overriding need to introduce labour-saving machines and equipment. Modern baking ovens play a dominant rôle in this development. The heat storage principle has been abandoned in the latest designs of multi-deck baking ovens.

Messrs. Debag, of Munich, developed the first gas-fired multi-deck oven before the war. The hot air was circulated by a fan, and a total efficiency of 60% to 65% was achieved compared with 20% of a steam baking oven in brickwork. Latest designs are based on high-class insulation within a steel structure, but without heat storage on forced circulation of the hot air or hot gas and on rectangular, plain hearths, with semi-automatic feeding arrangements. This design provides excellent flexibility in temperature control, a minimum of delay between the end of one charge and start of the next charge and low fuel consumption.

Hot Air Circulation

The first illustration shows the working principle of a multi-deck baking oven with hot air circulation, as manufactured by Debag-Munich, who produce only two sizes. Large bakeries operate two or more of the larger size. In addition, there are available the multi-deck baking ovens with hot gas circulation—cyklotherm system—as manufactured by Messrs. Werner & Pfleiderer, of Stuttgart, who produce a range of six sizes. Three sizes have four to five hearths of 2-ft. width and of varying lengths, two sizes have double and the last size three times the hearth width.

H. Heyer. Gas-Wärme. Vol. 7. No. 11. November, 1958, p. 376.



1—Hearth for indirect heating
2—Special refractories
3—Burner
4—Main hot-gas stream
5—Branch hot-gas stream
6—Insulation

GAS IN FRANCE

FRENCH GAS ECONOMICS

NEITHER the recession in world economy nor the particular necessity for France to restore its finances and its money to a healthy condition interrupted the steady progress of the gas industry in the year 1958. In the centralised gasworks, at the coke oven plants at the pitheads or at the steelworks, in the petroleum refineries, the production of gas for sale continued to grow. While in the Sahara the petroleum companies pursued their surveys and prepared for the exploitation of immense reserves of methane; the gas of the first section of the programme of the Ste. Nationale des Petroles d'Aquitaine has just been added to the production of the Regie Autonome des Pétroles in the south-west of France; at the end of 1958 it began to feed the Western Region.

Some 15.4 milliards of thermies (say 61.6 million therms) were sold by Gaz de France in 1958. About 60% came from its own production; 30% was purchased from collieries or steelworks; the remainder came in about equal proportions from natural and refinery gases. In view of the evolution of the market for solid mineral fuels, the industry reduced from 2.4 to 2 mill. tonnes its production of coke for sale—adjusting its programme of manufacture to increase the production of gas. It distilled less coal and correspondingly increased its use of petroleum products. All restriction fell upon imports of coal. While the gasworks treated 4.1 mill. tonnes of coal, a reduction of 10%, more than 80% of total production came from the carbonisation of coal.

Gratifying Results

Compared with 1957, sales of gas increased by 8%; sales in the domestic market by 7% and to industry 14% with an overall increase in the number of consumers by 130,000. It is claimed that these are gratifying results, in view, in the first case, of the relative mildness of the weather, in the second of the unfavourable economic conditions.

Gaz de France began in 1958 the execution of its third plan of equipment; 59 milliards of francs were expended during the year on new works. Nearly 24 milliards were spent on the extension of transmission mains from Lacq beyond the south-west. In October, 1958, the arterial main to Nantes was put into service and progress was made with other arterial mains.

The underground storage at Beynes was increased by several hundred million thermies, reaching nearly 140 mill. cu. m. (say, 4,943 mill. cu.ft.) by the end of 1958. The capacity of the injection plant has been raised to 730,000 cu. m. per day—it is intended to reach 1 mill. cu. m. per day—so that the total volume stored by the end of 1959 should reach about 240 mill. cu. m. (say, 8,475 mill. cu.ft.).

At Vernon, exploratory borings gave satisfactory results. The possibilities of other underground storage sites are being studied in collaboration with the producers of natural gas.

An experimental station for the liquefaction of methane is in course of construction at Nantes. It has been decided to carry out the reconnaisance of a submarine route for the transmission of natural gas from the Sahara between the Algerian port, Mostaganeum, and Carthegana in Spain.

From 1957 to 1958, the average cost per ton of coal used increased by 12%; cost of gas purchased rose by 9% for coal gas, 8% for refinery gas and 1.6% for natural gas.

Regarding tariffs for the sale of gas, no further Governmental Regulations were issued in 1958. Gaz de France has been able to keep within the general rise of 10% authorised by the decree of 14th December, 1957, by means of modifications in the structure of tariffs, particularly by the progressive extension of two-part tariffs during the year. Overall, the average price of gas sold increased from 6.32 francs per thermie in 1957 to 6.95 francs in 1958. The total rise from 1956 to 1958 averaged 14.2% against nominal increases authorised of more than 20%.

(Extracted from the 1958 annual report of Gaz de France.)

Collaboration Agreement

In the scheme of works to transmit natural gas from the extreme south-west to Paris the first crossing of the Seine was completed on August 25, 1959, between Vernon and Saint Mammes just below Montereau about 160 miles south-west of Paris. The bed of the river has a width of 105 metres at this point; the depth of water at normal levels attains 5.88 metres. River traffic is considerable. The double main, 508-mm. (say, 20-in.) external diameter, is laid in the bed of the river.

M. Delbourg's description, given at a recent conference, is reported on new specifications of control burners of the Gaz de France design for testing the interchangeability of gases for use in domestic appliances. M. Delbourg discusses the principles involved and the report is illustrated by photographs, diagrams and graphs.

An elaborate Agreement (Protocol) is reported (in full) between Gaz de France and the Syndicate of Constructors of Ovens and Thermal Equipment. The object is to facilitate collaboration between Gaz de France and the constructors with a view to the development of industrial applications of gas and the best possible utilisation of this source of energy. The Protocol was signed in Paris on April 21 last by the Director-General, M. B. Kuhn de Chizelle, and the President of the Syndicate, M. J-P. Guy.

A Committee of Liaison was set up, consisting of an equal number of representatives of the two sides, assisted by two ' commissions,' one technical, the other economic, each of two representatives of each side, to study questions remitted to them by the Committee. The articles of the Protocol set out arrangements for the pooling of information. Rights of manufacture under patents

taken out by Gaz de France are to be assigned to approved manufacturers on payment of suitable fees.

The Scientific and Technical Building Centre has issued recommendations on this subject which are published in full; they include suggestions for the relative positions of a subway and sewers. Gaz de France places its laboratories and works at the disposal of manufacturers for the realisation of projects under their patents, either under the usual conditions of personal secrecy or in collaboration with the services of Gaz de France.

The Protocol, as set out, is valid for a year, after which it will be re-examined with a view to any modifications which may be judged useful in the general interest.

(From the *Journal des Industries du Gaz*, August-September, 1959.)

SOUTH AFRICA

REPLACING OBSOLETE EQUIPMENT

THE two largest gas producers in the Union of South Africa embodying the two-stage principle have just been installed at the Union Steel Corporation's Vaal Works at Vereeniging. One of these two units supplies hot raw gas to Usco's open hearth plant and is already in operation. The second plant which will supply cold clean gas to the foundry, heat treatment furnaces, the new 16-in. mill furnace and the open hearth casting pit for ladle drying, was expected to be started up towards the end of August this year. These two units, supplied by the International Furnace Equipment Co. Ltd. of Aldridge, Staffs, may be the forerunners of similar units to be installed, to replace obsolete gas producing equipment.

The producer bodies or shells are double-walled, water-filled vessels, and each is connected by circulation piping to a horizontal cylindrical vessel in which the steam required for gasification of the fuel is generated. All these vessels are designed to conform to standard specifications for welded boilers. The tall steel casings each in three parts, which surmount the shells, are lined with special refractories of the highest quality and serve as distillation retorts in which the coal is carbonized before being gasified.

In the conventional producer hot gases from the gasification zone must pass up through the distillation and drying zones and their sensible heat causes uncontrolled distillation and partial cracking of the volatile constituents of the coal. To avoid this the passage of gases through these zones must be controlled, to furnish only the required amount of heat for drying and gentle distillation of the volatile matter. The two-stage producer on the other hand has two off-takes of which the lower takes away a quantity of gas before the distillation retort. By varying this quantity the amount of gas passing through the distillation and drying zones can be controlled to give the ideal rate and temperature for the distillation of the volatile matter. In this way the two processes, gasification and distillation are separated and at the same time brought under control.

The type of generator installed at Usco is designed to work with bituminous coal, each of the two units using 2.8 short tons of large nuts per hour from the Tweefontein collieries. Similar units installed overseas by the International Furnace Equipment Co. Ltd. are gasifying 65 to 70 long tons of fuel per 24-hour day.

The thermal efficiency of the hot raw gas two-stage producer, including gas, tar and sensible heat, is of the order of .9, and that of the plant which will supply cold clean gas is on the cold gas basis about .75, the gas being cleaned of dust and tar to .2 g. per cu. m. (.9 grains per 100 cu.ft.), or less. The quality of the gas produced is high and its gross calorific value may be greater than 175 B.t.u. per cu.ft.

In the two-stage gas produced there is complete absence of soot deposits which normally foul hot gas mains, and for this reason necessitate their periodic burning-out. The raw gas mains at Usco are therefore not brick-lined.

I.F.E. plants installed overseas, supplying hot raw gas through insulated mains up to 450 ft. in length, have been in operation for years without burning-out of the main being required. This is due to the fact that in the two-stage producer the process of distillation is carried out under closely controlled conditions so that the volatile products are gently distilled from the coal as each charge of fuel moves down inside the generator towards the gasification zone. The tar and light oils, the products of distillation, are uncracked and remain in the gas stream as vapour.

Underneath the producer shells a water jacket surrounds the ash and gasification zones to prevent clinkering. The jackets are connected by circulation piping to the adjacent steam drums. The ashpans of the generator units are water-sealed, and there are Lockheed hydraulic mechanisms for turning the grate past the ashploughs At the moment ash is removed by cocopans below the generators, but a conveyor system to remove the ash will shortly be installed in the future.

Both two-stage generators at Usco are fed by means of identical two-drum coal feeders which operate automatically according to the height of the fuel within the generators. The feeders are designed to introduce the charges with the minimum of abrasion to the fuel, thus keeping down the quantity of fines at the same time providing a gas-tight seal. Adjacent are the instrument panels and the bins which feed the two-drum feeders. The bins are filled by means of a butterfly-valve controlled chute which in turn is fed by a belt conveyor. Coal is delivered to this conveyor by means of a skip, which runs up one side of the building on a Strachan and Henshaw skip hoist.

The clean gas unit has no dust cyclone. Instead the gas from its lower offtake is cooled and washed with re-circulated water in a steel washing column.

Trade News

THE COOLING AND FLAKING OF MEDIUM AND HARD PITCH

THE pitch industry has shown increasing interest in recent years in the equipment and methods available for cooling pitch as it is discharged from the distillation column. The problem is to cool the pitch rapidly enough for it to be handled easily, stored or despatched immediately it is discharged from the distillation column, thereby obviating the need for large pitch beds.

An effective solution to this problem is by the use of Sandvik water-cooled steel band conveyors which cool the pitch by two distinct methods.

Operation essentials

Method I is the water-bed or spray type in which the cooling water never comes into contact with the pitch. The essentials of its operation are that the steel band conveyor carrying the pitch moves forward over a series of water tanks, down the centre of which is a water pipe fitted with spray nozzles. These work under a pressure of 20/25 p.s.i. and spray the underside of the steel band with cooling water which falls back into the tank where it is collected and either re-circulated through a cooling system, run to waste or re-used in other parts of the installation. By the time the pitch reaches the driving drum it is in a hard brittle form and cracks and breaks away from the steel band to be delivered as flake over the drum.

Complete submersion

Method II is the submerged type, wherein the pitch is always in contact with the cooling water. In this method the steel band conveyor, instead of passing over the top of the water tanks, passes under a set of depressing rollers sited on the edges of the band which take the band and the pitch into a water-bath, so that the whole is completely submerged during its travel from one end of the conveyor installation to the other. At the discharge point the steel band is lifted out of the water on an incline where rubber squeegees remove the surplus water from the now solid pitch. The cracking and splintering of the pitch takes place over the delivery point.

The ancillary equipment for both types of plant is virtually identical. A weir type feeder is used to spread the pitch on to the band in an even layer. The feed can be either direct from the distillation plant or *via* a straightforward holding tank situated above the feeder or through a holding tank sited similarly, but having a balanced closed circuit flow. This latter method is preferable as it enables the flow of pitch to the weir to be maintained at a constant head, regardless of the level of the pitch in the holding tank.

The weir feeder is constructed of mild steel and is either steam jacketted or oil jacketted and fitted with immersion heaters. It has been found, however, that the design of the steam jacketted type of feeder to withstand temperatures of steam much above 100°C. is impractical. With the oil jacketted type, fairly high temperatures are possible with very low pressures and the feeder can, therefore, be of a much lighter construction.

Maintaining temperature

The oil jacket of the feeder has a capacity of approximately 7 gall. of oil which is heated by two 2 kW Tubalox oil immersion heaters and controlled by a Satchwell immersion thermostat. The whole of the outside of the feeder is lagged. The two immersion heaters are in operation for only a short time at the beginning of the conveyor run, as the temperature thereafter is maintained by the heat from the pitch.

The feeder is mounted above the steel band with a small gap between the lip and the surface of the band, so that the pitch flows smoothly from the feeder on to the steel band. The band is already chilled when the pitch is fed on to it and thus the immediate spraying of the underside of the band from the spray nozzles or the submerging of the band into water—depending on which method is employed—prevents any appreciable spread of the pitch towards the edges of the band.

The viscosity of the pitch is governed by the pitch feed to the weir and by controlling the speed of the steel band which is variable over a fairly extensive range. One point worth noting is that when the pitch is first fed on to the band, a certain amount of fuming takes place which can become quite severe, depending on the initial temperature of the material. Because of this, it may be necessary to mount a fume hood and exhaust fan at the feed point.

After delivery over the terminal drum, the pitch is conveyed and elevated as required, either into stockpiles or into hoppers for feeding directly into lorries or railway wagons. In some instances where the plant is adjacent to a railway siding, the conveyor installation has been installed at a high level with the terminal drum delivering directly into railway wagons.

The spray type is, in general, a less efficient cooling device than the submerged type and therefore a longer conveyor is required for cooling the pitch under the same conditions. This is offset to some extent by the fact that the pitch stream needs to be narrower on the submerged type in order to accommodate the depressing rollers. Generally, however, it can be said that on plants of average capacity, a submerged type of installation requires a steel band conveyor only ¼ of the length required for the spray type.

The central advantage of the submerged type is that the pitch can be produced in a thickness of approximately $\frac{3}{16}$ in. against only $\frac{1}{16}$ in. with the spray type and there is considerably less danger of the thicker material breaking down into dust. Moreover, when operating a spray type system on exposed sites, it may be necessary to fit a cover over the top strand and latter portion of the conveyor to prevent solidified pitch from being blown out.—*Sandvik Steel Band Conveyors Ltd., Dawlish Road Works, Selly Oak, Birmingham, 29.*

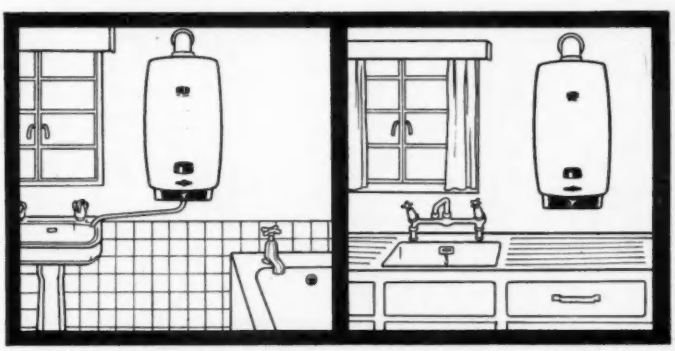
Sole agents for S.A.

The General Machinery & Foundry Supplies (Pty) Ltd., of Alberton, Johannesburg, South Africa, has been appointed sole agents for the sale of the RG and RG-AUTO tube cutting and screwing machines in South Africa, South West Africa and the Central African Federation.

3 reasons why the TRITON will sell!

- ideal as a single-point bath water heater
- unexcelled as a dual-point bathroom heater to serve both bath and basin
- admirable as a multi-point, installed at the kitchen sink, to serve this and both bathroom points.

The 'Triton' offers new and modern styling with integral draught baffler, flush fitting and exceptional freedom of access for normal maintenance, substantial construction with all water joints hard soldered. These are but a few of the special features of the 'Triton'—ask for full details.



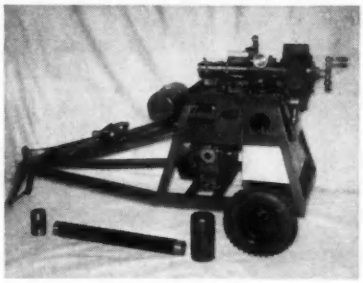
It's modern, it's multipurpose, it's MAIN!

Note the name—made by MAIN

W120

MAIN WATER HEATERS LTD., GOTHIC WORKS, THORNTON ROAD, CROYDON, SURREY.

From Kettering—



an automatic pipe threading machine

THE Spiro Ball Bearing Co. Ltd., of Kettering, has recently introduced a fully automatic pipe threading machine. It is simple to operate and either of the portable or stand type. The machine is powered by an electric motor or petrol engine drive, and in the case of the portable machine both electric motor and petrol engines can be fitted on the chassis, making the machine outstandingly adaptable for site work. An air motor can be fitted for use in ship construction.

The method of operation is simple and straightforward. The pipe to be screwed is placed on the work mandrel, which grips the pipe internally. The machine is started, and the correct depth of thread is set on the calibrated quadrant on the machine. The pipe to be screwed then moves automatically throughout the cycle of operations, completes one revolution, and the thread is formed perfectly. An automatic cut out stops the machine at the end of the operation. Threads are formed with an abrupt end to prevent damage in later handling, and this form of thread is found to be quicker for assembly purposes, due to the threads remaining undamaged.

The threads are cut by a milling process, and as the pipe is gripped internally, concentric threads are assured, giving uniform strength; flaws or seams in pipes are not accentuated. The teeth of the cutter cut from under the scale on the pipe, thereby preventing undue cutter wear. Extra attachments can be supplied to chamfer the ends of pipes for welding construction with the ends formed square to axis, concentric with the bore and either to a feather edge or with a land.—*Spiro Ball Bearing Co. Ltd., Regent Street, Kettering, Northants.*

25-TON CRANE IN TRUCK-MOUNTED RANGE

THE most recent addition to the truck-mounted range of machines made by Thomas Smith & Sons (Rodley) Ltd., Rodley, Leeds, is the M.E.I. truck crane, which has been introduced to meet the U.S.A. 25 ton (2,000 lbs.) lighting-capacity ratings. The maximum lifting capacity of this crane on British ratings is 22½ tons (50,000 lb.) at 10 ft. radius when working with the 30 ft. basic boom and 4.7 tons at 25 ft. radius with the maximum length of main boom, 100 ft.

Unrestricted travel

The truck on which this machine is mounted is a six-wheeled special Foden unit with a heavy-duty chassis frame, capable of carrying the enormous loads and twisting forces which are encountered by this type of vehicle. One outstanding feature of this machine is the overall width which has been kept to 8 ft. in order to permit unrestricted travel on public highways in Great Britain.

The crane carrier incorporates outriggers with screw jacks, which can be extended to 13 ft. centres to provide adequate stability for heavy loads and high-lift work. Special attention has been paid to the design of the outriggers to eliminate deflection and this has resulted in a much steadier crane than earlier models.—*Thomas Smith & Sons (Rodley) Ltd., Rodley, Leeds.*

New Manchester works for Muir-Hill vehicles

E. BOYDELL & CO. LTD., manufacturers of Muir-Hill dumpers, loaders and shunters, have opened a new works in Christie Road, Stretford, near to their main works in Old Trafford, Manchester. The decision to centralize sheet metal working, heavy fabrication and sub-assembly at the new works is in keeping with the company's progressive development policy.

The object of housing these production phases under one roof is to facilitate the development of prototype units and to streamline the manufacture of all current Muir-Hill machines. A wide range of component parts, including dumper bodies, chassis, loader beams, radiator grilles, engine covers and fuel tanks, will now be produced at Christie Road.

Spacious stockyard

The new premises occupy a site which offers ample room for expansion in the future. Administrative offices, heavy fabrication bay, metalworking bay and grinding and finishing bay, are all housed in the main building which is flanked by a number of storehouses and a spacious metal stockyard served by three mobile cranes.

Materials entering the metalworking bay are handled by an electrically operated Felco gantry hoist. The plant in this section includes a 250-ton electro-hydraulic press brake, Pullomax cutters, guillotines, profile cutters and folding and rolling machines.

Fabrication bay

The fabrication bay contains banks of welding booths each equipped with the latest electro-welding gear and each served by independent electric hoists. Following sub-assembly and inspection, units are prime painted and transported to the main works for final assembly.—*E. Boydell & Co. Ltd., Christie Road, Stretford, Manchester.*

TURNERS ASBESTOS LATEST BOOKLET

THE latest booklet from Turners Asbestos Cement Co. Ltd. has 36 pages, is profusely illustrated with photographs, data charts and line drawings, and is a brief interpretation of the byelaws in relation to asbestos and asbestos-cement materials.

A revision of an earlier publication, it has additional paragraphs on (a) combustibility test, (b) external fire exposure roof test and (c) corroglaze sheets. The illustrations show various fire tests which are normally carried out at the Fire Research Station on different types of structures such as floors, walls and columns.

Copies of the booklet *Fire Protection of Structures* may be obtained from—*Turners Asbestos Co. Ltd., Trafford Park, Manchester.*

Arkon indicator range extended

WALKER, CROSWELLER & CO., LTD., Cheltenham, has extended the range of its Arkon variable flow indicators. These instruments can be adjusted for high or low velocities of flow and now include sizes 1¼ in., 1½ in. and 2 in., in addition to ½ in., ¾ in. and 1 in.

Interchangeable

The principle of cartridge construction, as applied in these Arkon instruments, has met with immediate acceptance in preference to other methods. With Arkon indicators, the complete cartridge assembly is interchangeable between the different sizes. The spindle impeller assembly, which is fitted in a cartridge housing, is easily removed and reset for the required flow range.

The Arkon indicator itself is simple and reliable and shows at a glance whether flow is taking place. A chromium-plated ring at the top of the spindle under a toughened glass dome stops spinning if the flow stops.

Arkon variable flow indicators may be used to indicate the flow of water, lubricating oil, cooling oil, and other liquids.—*Walker, Crosweller & Co., Ltd., Cheltenham, Glos.*

TWO BRITISH OXYGEN PIPE CUTTING MACHINES

TWO new hand-operated machines for cutting steel pipes have been introduced by British Oxygen Gases Ltd. The portable pipe cutting and bevelling machine is a lightweight portable machine designed to square cut pipes of 4 in. diameter and over.

The cutting blowpipe is of the Saffire nozzle-mix type and is suitable for cutting pipes up to 2 in. in wall thickness. It is mounted on a four-wheeled trolley, strapped to the pipe by a special wrap-around chain. This chain passes around the pipe and over a tensioned sprocket on the trolley. The sprocket is turned by means of a worm and worm wheel attached to the operating handle.

The chain has been specially designed to enable any number of links to be removed or inserted, thus enabling any diameter of pipe above 4 in. diameter to be cut. The edge of the pipe can be cut square or given up to a 45° bevel. For pipes over 24 in. diameter, extra chain can be supplied. The chain is manufactured from malleable cast iron and a length is supplied with each machine.

The Alyn tube profile cutter has been designed for accurate profiling of pipes for branchwork in both site and workshop conditions to meet the exacting quality demands of certain industries and the economic requirements of the installation engineer. As the profile is self-generated, no marking off is required and consequently pipe branches can be made more quickly and more accurately.

Basically, the machine consists of a hollow spindle carrying a self-centring chuck at each end and free to rotate in a head-stock. Attached to the head-stock is a special axial motion device on which a nozzle-mixing type cutting blowpipe is mounted. This latter can be set to give square edge or bevel edge cuts of up to 45°.

Axial motion

Axial motion is infinitely variable from zero to the maximum motion for which the machine is designed and will produce a profile on any diameter pipe, within the capacity of the machine, to suit a main pipe equal to, or greater than, the diameter of the branch to be cut. The standard machine will cut profiles for 90° branches only.

The selection of the desired profile is by a simple handwheel. This allows the operator to set the machine to cut the required profile in a few seconds.

A 3 in. diameter pipe has been cut in 40 to 50 seconds.

Profile settings are indicated on a scale on the side of the machine and are marked in nominal B.S.P. pipe diameters. The Mark I machine covers pipes up to 4 in. diameter while the Mark II machine, which is in course of production, will take from 5 in. to 12 in. diameter pipes.—*British Oxygen Gases, Ltd., Spencer House, St. James's Place, London, S.W.1.*

Vibration damper from Holmes

THE venturi vibration damper, developed by the Chemical Engineering Division of W. C. Holmes & Co. Ltd., has been designed to eliminate vibrations in compressed gases due to pressure fluctuations produced by reciprocating or lobe type compressors

Pressure fluctuations of this type can have serious consequences, both in the pipe-lines carrying the gases and in any gas treatment plant before or after the compressors. They can set up sympathetic vibrations in the pipe-lines themselves, in pipe supports and in such plant as after-coolers, often with disastrous results. Tubes in the houses at Foleshill gasworks, Coventry, after-coolers are frequently broken through fatigue resulting from vibration, and side plates and division walls are occasionally broken or torn.

The theory on which the venturi is based is that the pressure fluctuations are high velocity movements in the gas, and by bringing the whole of the gas up to or approaching the velocity of the pressure fluctuations, and subsequently reducing the velocity again, some or all of the fluctuations are eliminated. If the whole of the gas could be brought up to the velocity of sound and subsequently expanded, clearly the whole of the vibrations would be removed. Such a high velocity is impracticable, but it has been found that an intermediate velocity is sufficient to remove the bulk of the fluctuations in gas pressure.

The particular advantage of using a venturi for this purpose is that the kinetic energy of the gas can be recovered almost completely, thus reducing the pressure loss which would otherwise be involved.—*W. C. Holmes & Co. Ltd., Turnbridge, Huddersfield.*

W.M.G.B. places order

W. H. ALLEN SONS & CO. LTD., have received an order from the Warwickshire Division of the West Midlands Gas Board for the supply of two 175-kW C.M.R. back-pressure single-stage steam turbines for direct coupling to Electric Construction Company alternators, for installation in the retort

FURNACE CONTROL

FOXBORO-YOXALL'S long experience in the measurement and control of dew-point of furnace gases has given rise to a recent development in this field. The company now supplies a self contained cabinet, fully piped and wired, incorporating record and control functions and providing a precise method of controlling furnace atmospheres, based on the simple relationship between dew-point and carbon potential. The unit is eminently suitable for atmosphere control on a wide range of heat treatment processes including, gas carburising, carbonitriding and bright annealing. —*Foxboro-Yoxall, Ltd., Redhill, Surrey.*

STEEL SHELVING

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